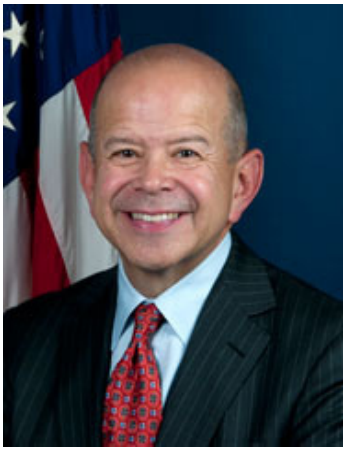
NextGEN

NextGen Implementation Plan 2016



From the **Administrator**

June 2016

Working in close collaboration with our aviation community partners, the FAA completed the majority of NextGen's foundational infrastructure in 2015. Operators are already reaping benefits from the delivery of these programs, upon which we are continuing to build in 2016.

We are pleased to provide you with the latest information on six of the programs that are reshaping operations in the National Airspace System (NAS):

- Automatic Dependent Surveillance–Broadcast (ADS-B)
- Data Communications (Data Comm)
- En Route Automation Modernization (ERAM)
- Terminal Automation Modernization and Replacement (TAMR)
- NAS Voice System (NVS)
- System Wide Information Management (SWIM)

With the exception of NVS, which is still in the test and evaluation phase, each of these programs is delivering benefits today while providing a platform for additional capabilities that will provide even more benefits in the coming years. Timelines for new NextGen capabilities that are being developed and matured through our implementation portfolio process are highlighted in the second half of this report.

Data Comm wrapped up operational trials in Memphis and Newark, and as of this writing, tower departure clearance services are now available at more than 20 airports, including all of the New York area airports. Towers at a total of 56 airports are expected to be equipped for Data Comm departure clearances by the end of 2016 — 3 years ahead of schedule. Through our Equip 2020 outreach effort, we have made tremendous strides in fostering ADS-B equipage well in advance of the 1 January 2020 mandate. Since Equip 2020's October 2014 Call to Action, the number of ADS-B equipped aircraft has more than doubled, and these numbers continue to grow.

Many of these accomplishments could only have been achieved through close collaboration with industry, and in late 2015 we released an update to the NextGen Joint Implementation Plan, which details our commitment to provide the capabilities in which the aviation community is most interested, in the areas where they are most needed.

I trust you will find the 2016 NextGen Implementation Plan to be of value. Should you have any questions about the information reported in this document, please contact me or Rachel Milberg, Acting Assistant Administrator for Government and Industry Affairs, at (202) 267-3277.

Sincerely,

Michael P. Huerta
Administrator

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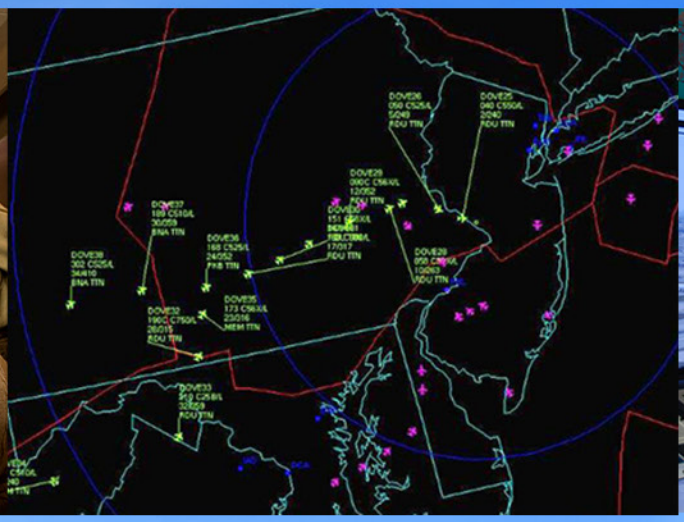
NEXTGEN PROGRAMS



AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST

Automatic Dependent Surveillance–Broadcast (ADS-B) is the successor to radar that uses onboard avionics to broadcast an aircraft's position, altitude and velocity to a network of ground stations, which relays the information to air traffic control displays and to nearby aircraft equipped to receive the data via ADS-B In. ADS-B In provides operators of properly equipped aircraft with traffic position information delivered directly to the cockpit. Aircraft equipped with a Universal Access Transceiver (UAT) will also receive weather and Notices to Airmen (NOTAM) via the Flight Information Services–Broadcast (FIS-B) service.

Aircraft operating in most controlled U.S. airspace — above 10,000 feet mean sea level (MSL) or in Class B or C airspace — must be equipped for ADS-B Out by January 1, 2020. ADS-B In equipage is not currently mandated.

TARGET USERS

- Aircraft owners and pilots flying above 10,000 feet MSL, within Class C airspace, the airspace surrounding most major airports or low altitude airspace along the Gulf of Mexico coastline
- Air traffic controllers
- Airport surface vehicle operators

EQUIPAGE REQUIREMENTS

Avionics equipment requirements for operators and installers are detailed in FAA Advisory Circulars AC 20-165B, AC 90-114A and AC 20-172B, and Technical Standard Orders TSO-C166b and TSO-C154c. To meet the ADS-B Out mandate, aircraft require a position source, such as GPS, and a compatible transmitter. A display device is needed for ADS-B In.

- Aircraft operating above 18,000 feet (FL180) or internationally require a Mode S transponder operating on 1090 MHz with Extended Squitter (1090ES). A 1090 MHz receiver is needed to process Traffic Information Service–Broadcast (TIS-B) information. FIS-B is not available with 1090 equipment.
- Aircraft operating within U.S. airspace below FL180 can use either a 1090ES or a UAT operating on 978 MHz. A UAT is capable of receiving TIS-B and FIS-B. However, you need a receiver and display to receive and view TIS-B and FIS-B information.

OPERATIONAL CAPABILITIES

ADS-B Out avionics transmit position, groundspeed and other data to nearby aircraft equipped for ADS-B In, and to ground receivers that provide the information to controllers. Additional aircraft avionics are required for ADS-B In to receive and display data from ground stations and other aircraft.

SERVICE CAPABILITIES

ADS-B In-equipped aircraft have access to the following additional broadcast services:

- FIS-B: On UAT, broadcasts graphical weather to the cockpit, as well as text-based advisories including NOTAMs, significant weather activity and pilot reports.
- TIS-B: Provides altitude, position and speed of aircraft flying in radar coverage and within a 15-nautical mile (nm) radius — as far as or within 3,500 feet above or below the receiving aircraft's position. Aircraft without ADS-B but equipped with transponders are tracked and broadcast over the 1090ES and UAT frequencies to ADS-B In-equipped aircraft.
- Automatic Dependent Surveillance–Rebroadcast (ADS-R): ADS-B Out information can be broadcast on two frequencies, 1090 MHz and 978 MHz. ADS-R rebroadcasts ground station data from one frequency to the other. It provides aircraft operating on on either ADS-B link the ability to see each other on their traffic displays when they are within 15 nm and 5,000 feet above or below each other, and within range of ground stations.

IMPLEMENTATION

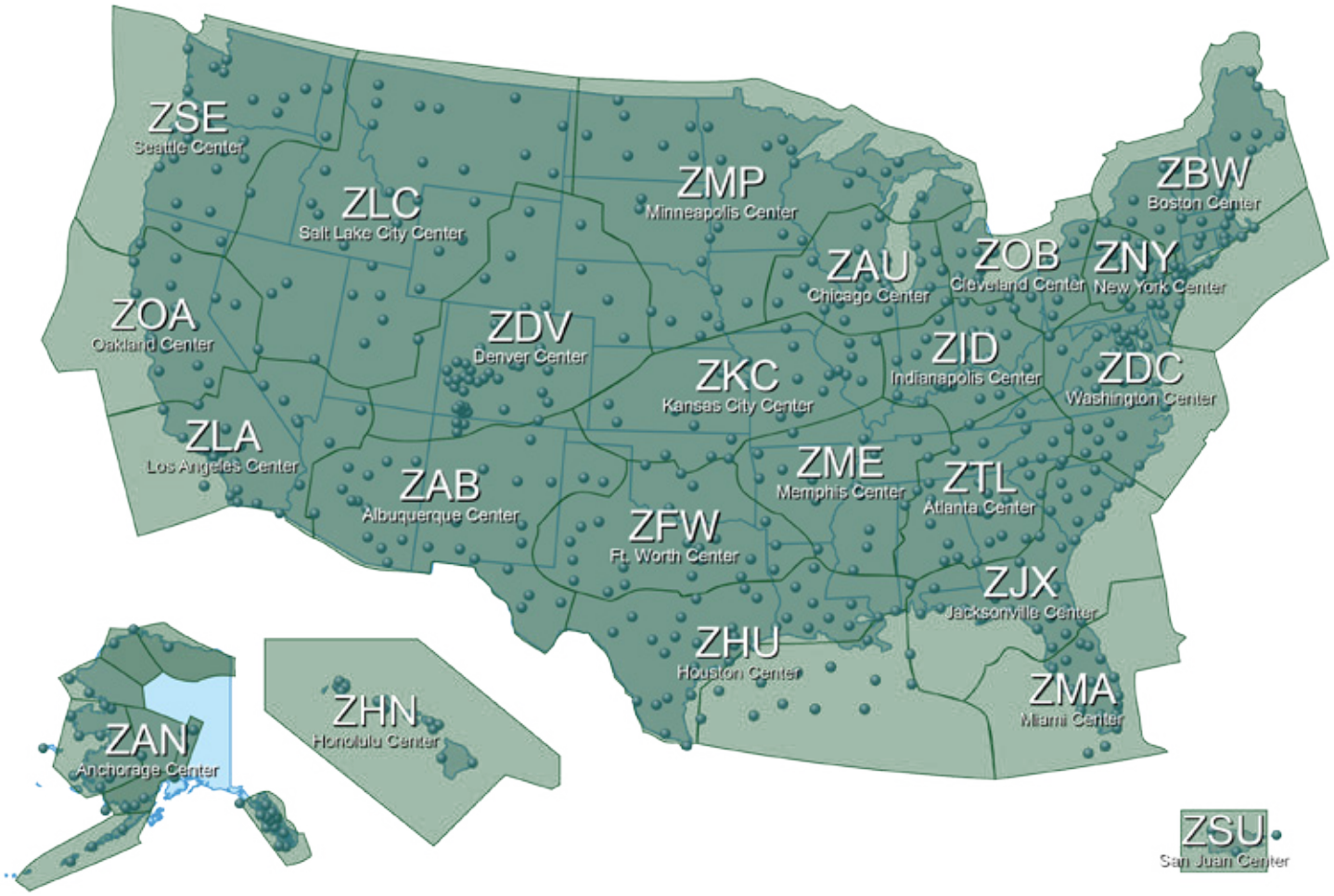
The FAA completed baseline, nationwide deployment of ADS-B ground stations in 2014. ADS-B has been integrated into automation platforms at all 24 en route air traffic control facilities — 20 En Route Automation Modernization systems and four Microprocessor En Route Automated Radar Tracking Systems (MEARTS) — which control high-altitude traffic. ADS-B has also been integrated into the automation platforms at the 30 busiest terminal areas, and is being deployed to all other terminal areas as their automation platforms are updated. ADS-B traffic and weather broadcasts are now available nationwide.

BENEFITS ACHIEVED TO DATE

- ADS-B has been tested successfully as a sole source of surveillance. Controllers can now track aircraft during radar outages in controlled airspace.
- A new ADS-B In capability, Cockpit Display of Traffic Information – Assisted Visual Separation, allows pilots to keep track of aircraft flying in front of them during a visual approach to a runway.
- ADS-B is used to control traffic in areas such as the Gulf of Mexico where radar surveillance is limited. Flights that used a special ADS-B route in the Gulf due to convective weather or adverse headwinds saved 7-11 minutes of flight time on average, burned less fuel and created fewer aircraft exhaust emissions than flights on traditional Area Navigation routes. ADS-B-equipped helicopters servicing oil platforms in the Gulf may fly in visual and instrument meteorological conditions under air traffic control. ADS-B allows direct routing clearances for properly equipped helicopters, which has shortened trips by about 14 nm and saved about 14 gallons of fuel per IFR flight. The FAA estimates flight savings of about 350,000 nm from December 2009 to February 2015.
- Airport Surface Detection Equipment–Model X, a ground-surveillance system that alerts air traffic controllers to potential runway and taxiway conflicts by using ADS-B and other data sources, reduces runway incursions and other ground operation accidents at 35 airports throughout the United States.
- Standards for a new ADS-B In capability, ADS-B Traffic Awareness System, were completed in 2014. This provides pilots with an audio alert to warn of other aircraft that might be a collision risk.
- General aviation pilots using UATs are receiving current weather and airspace status information from the FAA's free FIS-B service.

ADS-B COVERAGE AND EN ROUTE INTEGRATION

As of May 2016



PROGRAM MILESTONES	DATE
ADS-B Segment 1 and Segment 2 Investment Decision	August 2007
Segment 1 Surveillance and Broadcast Services Interim Situation Display for ADS-B	September 2010
Initial Operating Capability (IOC) ADS-B Capability on Common Automated Radar Terminal System IIIE at New York TRACON	July 2011
IOC ADS-B Capability on Standard Terminal Automation Replacement System at Houston TRACON	March 2012
IOC ERAM Release 3 with ADS-B Capability at Houston Center	April 2012
Flight Testing	June 2013
Achieve En Route Separation Services IOC at the 12th site	March 2014
Achieve 12 of 16 Remote Units sending Airport Service Surveillance Capability data to Air Traffic Control Tower equipment at SFO	March 2014
Achievement of critical Services Implementation Service Acceptance Test at all 306 Service Volumes (Services encompass ADS-B Out, ADS-B In, TIS-B, FIS-B)	March 2014
Complete baseline ADS-B radio station infrastructure deployment	March 2014
Achieve Terminal Separation Services IOC at the 55th site	June 2014
Complete IOC Surface Advisory Services at all 35 Airport Surface Detection Equipment–Model X sites	September 2014
Investment Analysis Readiness Decision for ADS-B In Applications Planning Milestones	June 2015
MEARTS Fusion Processing for 5 nm Separation Services IOC at ZAN	August 2015
Complete IOC at last (24th) En Route site	September 2015
Oceanic In-Trail Procedures operational at Oakland	August 2016
Expansion of Gulf of Mexico ADS-B coverage	September 2016
Final Investment Decision for ADS-B In Applications Planning Milestone	October 2017
Complete all Terminal and Surface IOCs	2019
ADS-B Out Rule Compliance (aircraft equipage deadline)	January 1, 2020

DATA COMMUNICATIONS

Data Communications (Data Comm) enables controllers and pilots to communicate with digitally delivered messages, rather than rely solely on radio voice communications. With the push of a button, controllers can electronically send routine instructions, such as departure clearances and weather-avoiding reroutes, directly to the flight deck. Messages appear only on the cockpit display of the aircraft to which they apply, reducing the potential for miscommunication that can occur from radio voice exchanges.

TARGET USERS

- Air traffic controllers
- Airline pilots
- Airline dispatchers

EQUIPAGE REQUIREMENTS

Future Air Navigation System 1/A

VHF Digital Link Mode 2 avionics for en route services

VHF Digital Link Mode 0 avionics will be accommodated for tower services

OPERATIONAL CAPABILITIES

- Data Comm is initially delivering digital tower departure clearance services, including route revisions.
- Data Comm services will be implemented in en route airspace, enabling controllers to provide pilots with frequency handoffs, altitude changes and inflight reroutes. Pilots can also send digital messages to controllers.
- Collectively, these services will save time, increase controller and pilot productivity, and reduce the potential for miscommunication as controllers send digital messages to each aircraft. These improvements enable greater efficiency, improved routing around weather and congestion, and increased flexibility and accommodation of user requests.

IMPLEMENTATION

Tower trials at Memphis and Newark finished in January 2016. The FAA achieved Initial Operating Capability (IOC) for Data Comm tower services at Salt Lake City, Houston Bush, Houston Hobby, New Orleans, Louisville, New York John F. Kennedy, Newark, San Antonio and Austin airports. The remaining tower deployments at 47 airports are planned for 2016–2019.

In late 2014, the FAA made the final investment decision and baselined initial en route services. Initial Data Comm capabilities are expected in high-altitude airspace beginning in 2019. The FAA expects to achieve IOC at all 20 en route centers in the continental United States by 2021.

The FAA is providing incentive money for operators to equip with Data Comm on the flight decks of 1,900 aircraft by 2019. Under the incentive program, eight airlines have agreed to add Data Comm avionics, with the first aircraft being equipped in 2014.

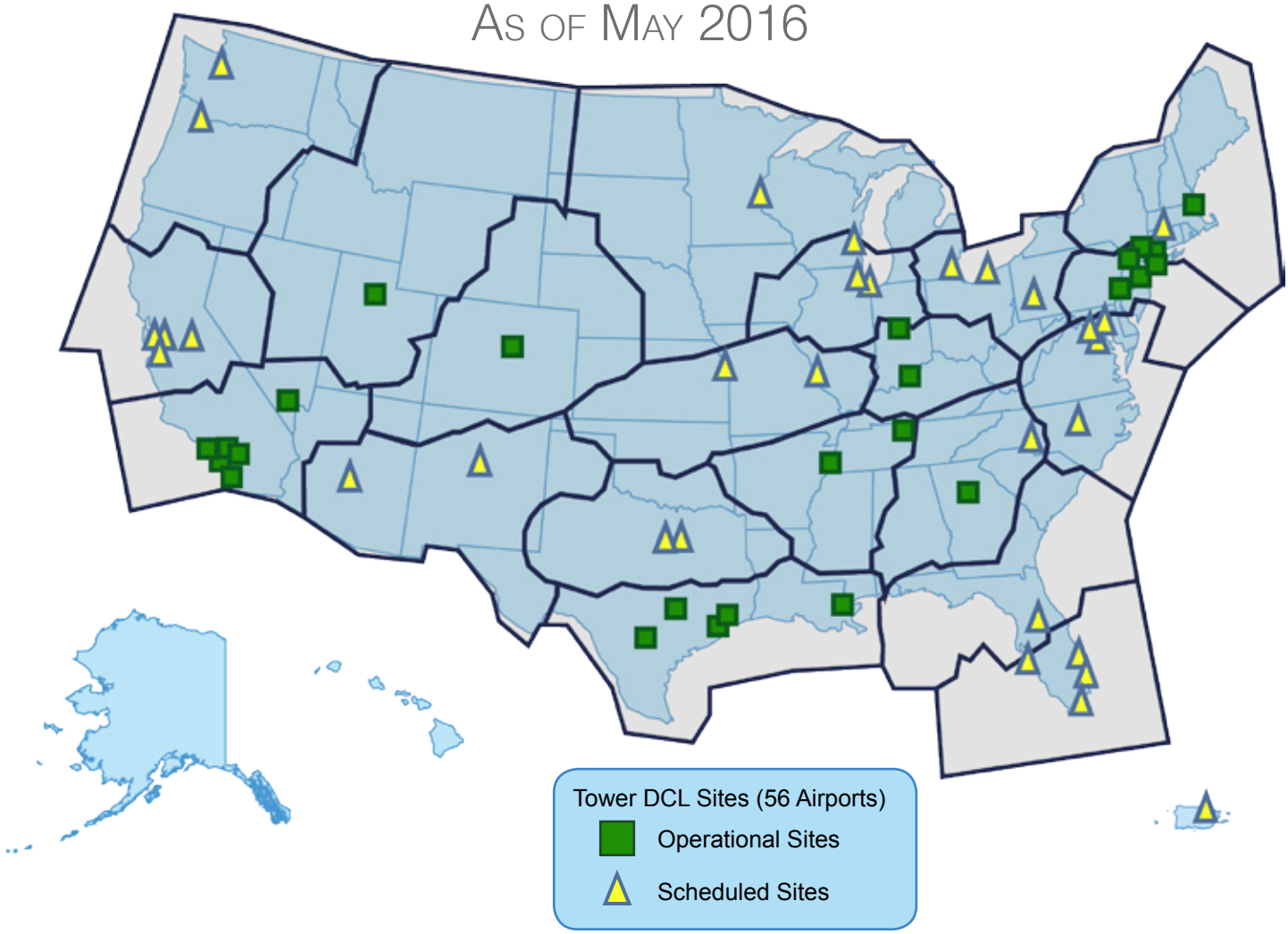
No deployment is currently planned for Terminal Radar Approach Control facilities, which control traffic arriving at and departing from our nation's airports. Advanced trajectory services are still in concept phase.

BENEFITS ACHIEVED TO DATE

Preliminary qualitative benefits seen during trials in Memphis and Newark include reduced communications time, resulting in faster taxi-outs, reduced delays and reduced pilot and controller workload.

DATA COMMUNICATIONS DEPARTURE CLEARANCE TOWER SERVICE

As of May 2016



PROGRAM MILESTONES	DATE
SEGMENT 1	
Data Comm Segment 1 Phase 1 Final Investment Decision (FID) for En Route Automation Modernization (ERAM) and Tower Data Link System (TDLS)	May 2012
Data Comm Segment 1 Phase 1 Data Comm Integrated Services Contract Award	September 2012
Data Comm Segment 1 Phase 1 TDLS Preliminary Design Review complete	October 2012
Data Comm Segment 1 Phase 1 TDLS Critical Design Review complete	July 2013
Complete Program Level Integrated Baseline Review	February 2014
Deliver Data Comm Network Service Build 1 to William J. Hughes Technical Center	March 2014
Data Comm Segment 1 Phase 1 ERAM Initial Test Release (ITR)	April 2014
TDLS V12 ITR	April 2014
Complete Data Comm Informal Integration and Interface Service Test	July 2014
Data Comm Segment 1 Phase 1 Operational Test and Evaluation	March 2015
Data Comm Segment 1 Phase 1 DCL Tower Services IOC at key site (Salt Lake City)	August 2015
IOC at Houston Hobby (HOU) and Houston Bush (IAH)	September 2015
Data Comm Segment 1 Phase 1 Site Operational Readiness Demonstration	September 2015
Data Comm Segment 1 Phase 1 In-Service Decision (ISD)	December 2015
Data Comm Segment 1 Phase 1 IOC at last site	May 2019
SEGMENT 1 PHASE 2	
Data Comm Segment 1 Phase 2 Initial En Route Services FID	October 2014
Data Comm Segment 1 Phase 2 Full En Route Services FID	December 2016
Data Comm Segment 1 Phase 2 Development Test and Evaluation Complete	June 2018
Data Comm Segment 1 Phase 2 IOC at first site	July 2019
Data Comm Segment 1 Phase 2 ISD	March 2020
Data Comm Segment 1 Phase 2 IOC at last site	February 2021
TOWER TRIALS	
Initiate Departure Clearance (DCL) tower trials at MEM	January 2013
Initiate DCL tower trials at EWR	April 2013
Complete DCL tower trials	January 2016

DEPARTURE CLEARANCE TOWER SERVICES CHALLENGE MILESTONES

The NextGen Priorities Joint Implementation Plan commits the FAA to begin delivering departure clearances at 56 airports under the Data Comm program's Segment 1 Phase 1. The baseline calls for this work to be completed by the end of 2019 but the agency is working toward challenge dates that would have services at all 56 locations in place by the end of 2016 (see chart below for specifics). The order of the towers may move within the groups based on operational requirements; however, the FAA and industry will work together to manage these changes.

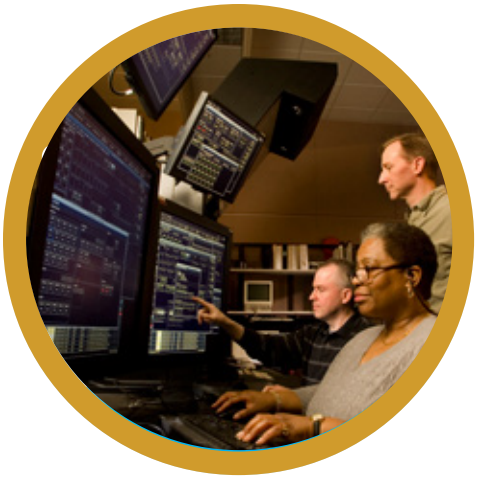
KEYSITE (3 TOWERS)			
SITE NAME	SITE ID	ARTCC ID	IOC (CY)
KS 1: Salt Lake City	SLC	ZLC	Q2 2015
KS 2: Houston Bush	IAH	ZHU	Q3 2015
KS 3: Houston Hobby	HOU	ZHU	Q3 2015

GROUP A (19 TOWERS)			
SITE NAME	SITE ID	ARTCC ID	IOC (CY)
New Orleans	MSY	ZHU	Q1 2016
Austin	AUS	ZHU	Q1 2016
San Antonio	SAT	ZHU	Q1 2016
Los Angeles	LAX	ZLA	Q1 2016
Las Vegas	LAS	ZLA	Q1 2016
San Diego	SAN	ZLA	Q2 2016
John Wayne	SNA	ZLA	Q2 2016
Bob Hope	BUR	ZLA	Q2 2016
Ontario	ONT	ZLA	Q2 2016
San Francisco	SFO	ZOA	Q2 2016
Oakland	OAK	ZOA	Q2 2016
San Jose	SJC	ZOA	Q3 2016
Sacramento	SMF	ZOA	Q3 2016
Phoenix	PHX	ZAB	Q3 2016
Albuquerque	ABQ	ZAB	Q3 2016
Seattle	SEA	ZSE	Q3 2016
Portland	PDX	ZSE	Q3 2016
Dallas Love	DAL	ZFW	Q4 2016
Dallas/Fort Worth (x2)	DFW	ZFW	Q4 2016

GROUP B (17 TOWERS)			
SITE NAME	SITE ID	ARTCC ID	IOC (CY)
Louisville	SDF	ZID	Q1 2016
Indianapolis	IND	ZID	Q1 2016
Memphis	MEM	ZME	Q2 2016
Nashville	BNA	ZME	Q2 2016
Denver	DEN	ZDV	Q2 2016
Atlanta	ATL	ZTL	Q2 2016
Charlotte	CLT	ZTL	Q2 2016
Jacksonville	JAX	ZJX	Q2 2016
Orlando	MCO	ZJX	Q3 2016
Miami	MIA	ZMA	Q3 2016
Fort Lauderdale	FLL	ZMA	Q3 2016
Tampa	TPA	ZMA	Q3 2016
Palm Beach	PBI	ZMA	Q3 2016
St. Louis	STL	ZKC	Q4 2016
Kansas City	MCI	ZKC	Q3 2016
Minneapolis-St. Paul	MSP	ZMP	Q4 2016

GROUP C (18 TOWERS)			
SITE NAME	SITE ID	ARTCC ID	IOC (CY)
Newark	EWR	ZNY	Q1 2016
New York John F. Kennedy	JFK	ZNY	Q1 2016
New York LaGuardia	LGA	ZNY	Q1 2016
Teterboro	TEB	ZNY	Q1 2016
Philadelphia	PHL	ZNY	Q2 2016
Westchester	HPN	ZNY	Q2 2016
Boston	BOS	ZBW	Q2 2016
Providence	PVD	ZBW	Q2 2016
Bradley	BDL	ZBW	Q2 2016
Detroit	DTW	ZOB	Q3 2016
Cleveland	CLE	ZOB	Q3 2016
Pittsburgh	PIT	ZDC	Q3 2016
Baltimore-Washington	BWI	ZDC	Q3 2016
Washington Dulles	IAD	ZDC	Q3 2016
Washington Reagan	DCA	ZDC	Q3 2016
Raleigh-Durham	RDU	ZDC	Q4 2016
Chicago Midway	MDW	ZAU	Q4 2016
Chicago O'Hare	ORD	ZAU	Q4 2016

EN ROUTE AUTOMATION MODERNIZATION



En Route Automation Modernization (ERAM) is one of the foundational programs of NextGen. It is a more capable and flexible platform than the decades-old HOST legacy system it replaces. ERAM is now online at the 20 en route traffic control centers in the contiguous United States. It performs core functions at the FAA centers where high-altitude air traffic is controlled. ERAM processes flight and surveillance radar data, enables efficient controller-pilot communications and generates detailed display data to air traffic controllers. It covers the majority of the nation's continental airspace — more than 3.2 million square miles — and controls more than 30 million flights annually. It serves as the platform upon which NextGen programs such as data sharing, digital communications and trajectory-based operations reside.

TARGET USERS

- Air traffic controllers at en route centers

EQUIPAGE REQUIREMENTS

Additional equipage not required for National Airspace System (NAS) users

OPERATIONAL CAPABILITIES

- ERAM combines flight plan information with surveillance data from Automatic Dependent Surveillance–Broadcast (ADS-B), Wide Area Multilateration and radar to automate a number of air traffic control functions such as tracking aircraft, providing conflict alerts and minimum safe altitude warnings, and recording air traffic events.
- ERAM enables controllers to see beyond the boundaries of the airspace controlled by their own center, enabling them to handle traffic more efficiently.
- Each ERAM system can track 1,900 aircraft at a time, compared with 1,100 for the HOST legacy system.

IMPLEMENTATION

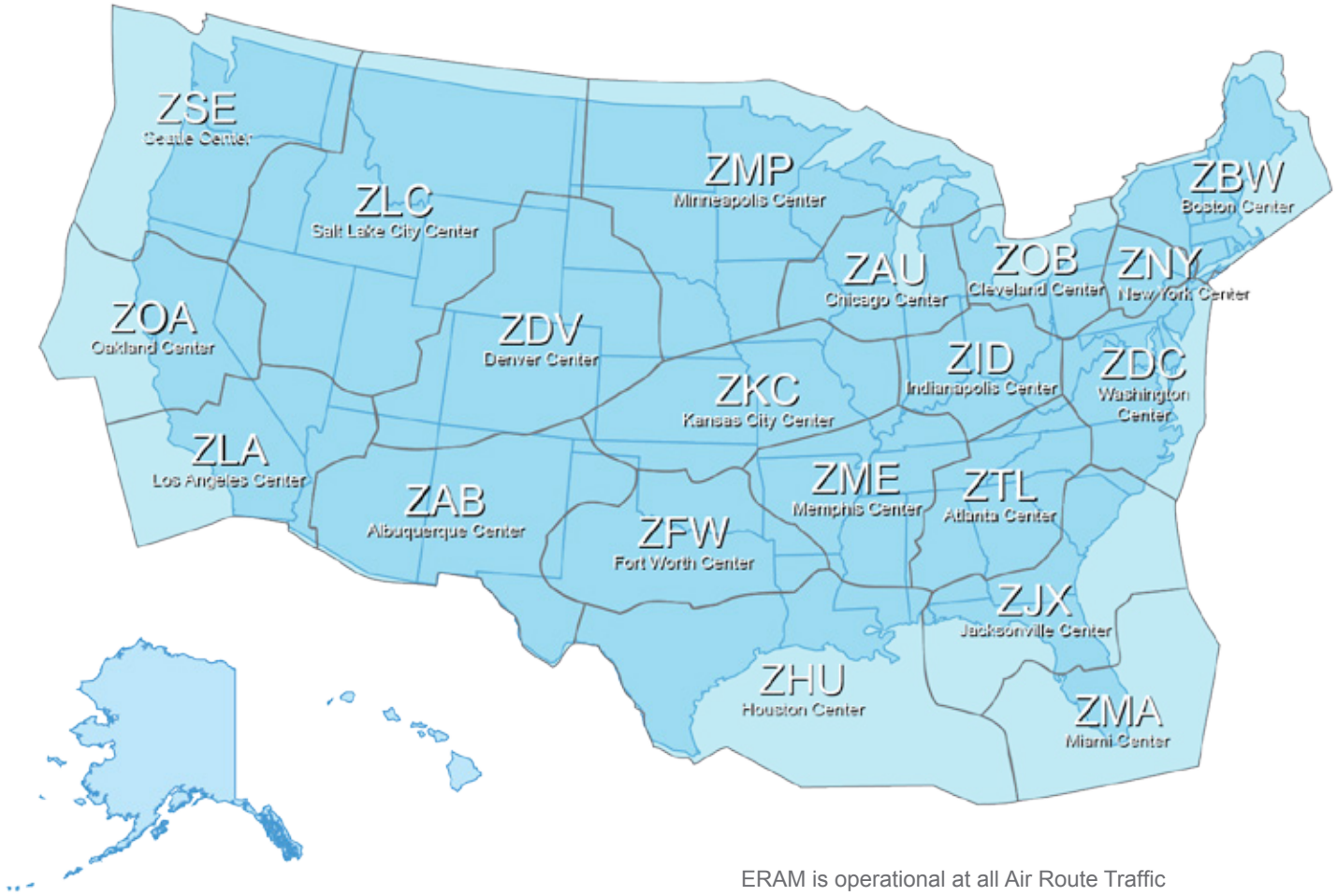
In March 2015, the 20 planned ERAM sites achieved operational readiness, which signified the full commissioning of ERAM into the NAS and allowed the FAA to begin decommissioning the legacy HOST system. Other air traffic facilities and government agencies are now connected to the centers via ERAM. In addition to Terminal Radar Approach Control facilities, this includes airport towers, the FAA Command Center and automated flight service stations, U.S. Department of Homeland Security, DoD, and U.S. Customs and Border Protection.

BENEFITS ACHIEVED TO DATE

- Processes data from 64 radars compared to HOST's 24 radars, providing far greater coverage than the legacy system
- Enables each ERAM system to track 1,900 aircraft at a time, an increase from the 1,100 previously available with HOST, enabling more efficient transitions between airspace sectors
- Enables controllers to coordinate traffic beyond the boundaries of the airspace controlled by their own center, so they can more efficiently transition traffic from one airspace sector to another
- Provides more accurate tracking of aircraft with target reports from multiple radars, replacing the single radar tracker in the legacy system
- Automates traffic conflict alerts and minimum safe altitude warnings, and records air traffic events
- Adds new capabilities to operate with variable separation standards, allowing controllers to separate aircraft in the most efficient manner possible, increasing airspace capacity
- Increases flexibility in routing around congestion, bad weather and other airspace restrictions
- Enables routine maintenance without interrupting air traffic control services, eliminating planned outages
- Gives controllers the ability to customize what they see on their screens
- Enables airlines to take advantage of their onboard equipment to fly Performance Based Navigation routes, which are more direct and fuel efficient
- Controllers encounter less stress, and realize increased collaboration and seamless data-sharing between centers
- Real-time air traffic management and information sharing about flight restrictions improve the ability of airlines to plan flights with minimal changes. More direct routing and increased radar coverage leads to smoother, faster and more cost-efficient flights
- Supports NextGen technologies such as ADS-B, System Wide Information Management and Data Communications

EN ROUTE AUTOMATION

As of May 2016



ERAM is operational at all Air Route Traffic Control Centers in the continental United States.

PROGRAM MILESTONES	DATE
Final Investment Decision (FID) for ERAM	June 2003
ERAM Release 1: Systems Integration Milestone	November 2006
ERAM Release 1: William J. Hughes Technical Center Government Acceptance	October 2007
ERAM Release 1: Key site - Government Acceptance	April 2008
ERAM In Service Decision	March 2011
ERAM Release 2: Key site Operation Readiness Demonstration (ORD)	March 2012
ERAM Release 3: First site ORD	August 2012
System Enhancement and Tech Refresh FID	February 2014
Collaborative Air Traffic Management (CATM) – Airborne Reroute (ABRR) – S/W Build EAC 1500 Release	May 2014
Investment Analysis Readiness Decision for ERAM Sector Enhancement Planning Milestone	June 2014
Investment Analysis Readiness Decision for ERAM Sector Enhancements	July 2014
Achieve Initial Operating Capability at last two sites (Jacksonville and Atlanta)	September 2014
Complete installation of En Route Information Display System (ERIDS) equipment components of first site	March 2015
Last site ORD	March 2015
Deploy first ERAM release containing system enhancements	May 2015
Complete installation of En Route Communication Gateway (ECG) router firewall equipment at first site	August 2015
Complete installation of ERIDS equipment components at last site	September 2015
Complete installation of ECG router firewall equipment at last site	March 2016
FID for ERAM Sector Enhancement Planning Milestone	September 2016
Collaborative Air Traffic Management (CATM) ABRR – ABRR capability operationally available	December 2016
Deploy last ERAM release containing system enhancements	September 2017

TERMINAL AUTOMATION MODERNIZATION AND REPLACEMENT

The Terminal Automation Modernization and Replacement (TAMR) program upgrades multiple air traffic control technologies to a single, state-of-the-art platform: the Standard Terminal Automation Replacement System (STARS). STARS is a foundational NextGen technology that enables Automatic Dependent Surveillance–Broadcast (ADS-B) and other NextGen programs. Controllers use STARS to provide air traffic control services to pilots in terminal airspace — the airspace immediately surrounding major airports.

TARGET USERS

- Air traffic controllers at towers and Terminal Radar Approach Control (TRACON) facilities

EQUIPAGE REQUIREMENTS

Additional equipage is not required for National Airspace System (NAS) users.

OPERATIONAL CAPABILITIES

- Offers individual preference settings for controllers' screens
- Meets operational requirements for core NextGen capabilities
- Provides data-recording capability and quadruple redundancy

IMPLEMENTATION

- The FAA completed most of the TAMR software development in 2015. Phases I and II of TAMR are finished*, and Phase III is under way.
- Phase I replaced the automated radar processing and display systems with the STARS system at 54 TRACON facilities and their associated air traffic control towers. Phase II upgraded four additional TRACONs with STARS and modernized the Common Automated Radar Terminal System at four more large TRACONs, which will be upgraded to STARS in Phase III.
- Phase III involves a technology refresh with software and hardware upgrades. In this phase, TAMR will replace more than 100 automation systems with STARS.
- Phase III is occurring in two segments. Segment I replaces the Automated Radar Terminal Systems (ARTS) IIIEs at 11 of the largest TRACONs. Segment II replaces the ARTS IIEs and ARTS IEs at the remaining sites. The FAA has achieved Initial Operating Capability (IOC) at seven sites for Segment I and 12 sites for Segment II.

*Ongoing technology refreshes to Phase I sites will be completed in 2020.

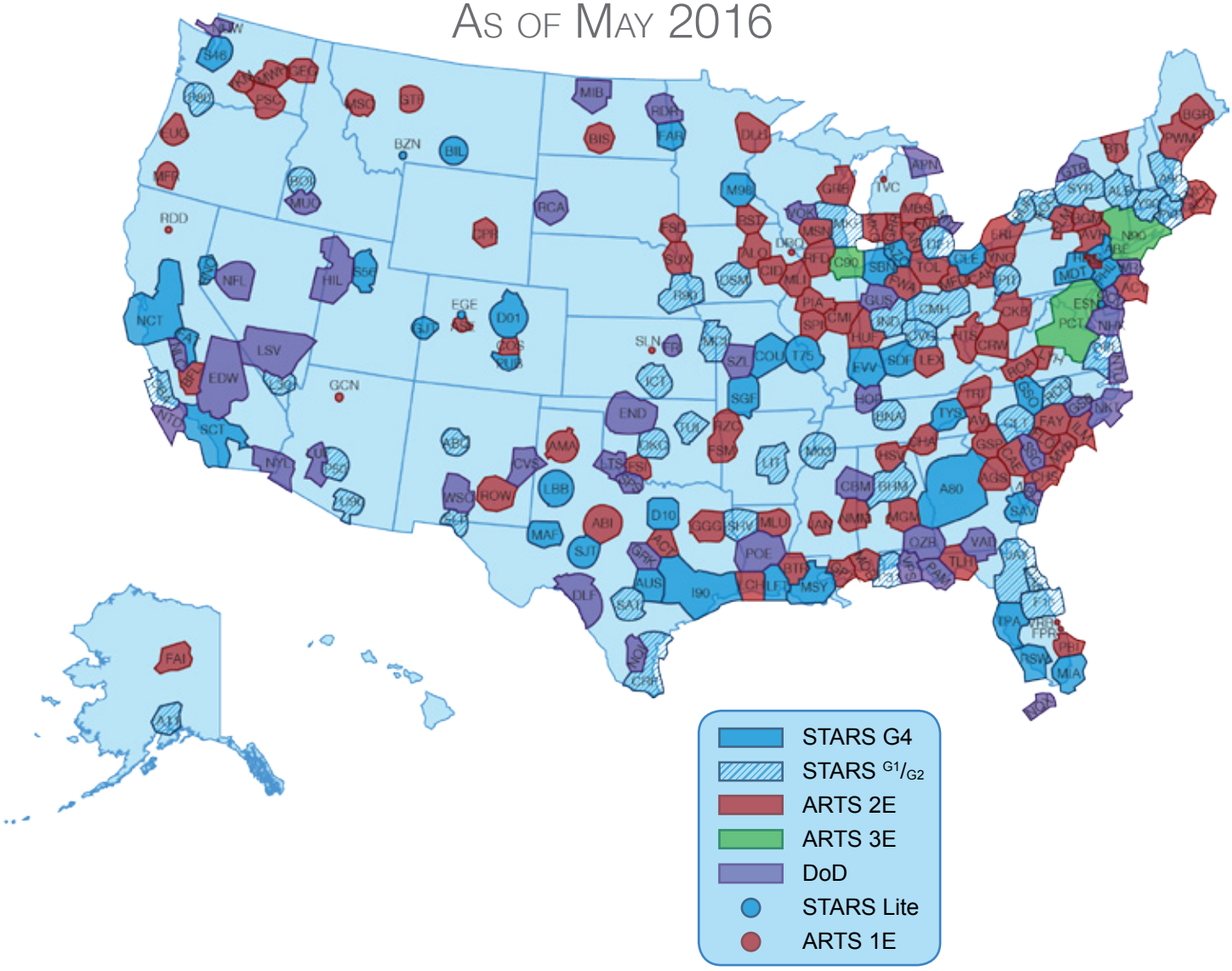
- TAMR has now achieved 19 out of 29 Acquisition Program Baseline goals on time. The most recent accomplishment for the program was achieving IOC at St. Louis on February 1, 2016, with continuous operations declared soon after. The Evansville, Indiana, TRACON also achieved IOC on September 18, 2015. This completed the goal for Phase III, Segment I (ARTS IIIE TRACONs), which was to achieve IOC at the fifth site by October 2015.
- The FAA has 10 more major milestones planned. This includes completing the New York TRACON, the last site slated for completion in Phase III, Segment I. Once operational readiness is completed in October 2017, it will finalize the Phase III, Segment I mission at the ARTS IIIE sites.
- The goal is to have the 11 TRACONs that handle 80 percent of all U.S. air traffic fully operational with STARS by October 2017. Full deployment of STARS is slated for 2020.

BENEFITS ACHIEVED TO DATE

- LCD screens used with STARS cut electricity use by 67 percent compared to cathode ray tube monitors, are easier to maintain and are more reliable than the previous screens.
- A single system throughout the NAS significantly reduces costs by eliminating the need to develop, test and deploy software on multiple platforms and maintain an aging automation platform.
- STARS provides air traffic controllers with a more complete airspace picture.

TERMINAL AUTOMATION

As of May 2016



PROGRAM MILESTONES	DATE
TAMR PHASE 1	
TAMR Phase 1 Final Investment Decision (FID)	September 2012
TAMR Phase 1 complete Initial Operating Capability (IOC) at key site	December 2012
TAMR Phase 1 Software Build R26 (STARS) complete	August 2013
TAMR Phase 1 National STARS Release Build 26	August 2013
TAMR Phase 1 Software Build 37C (CARTS) complete	September 2013
TAMR Phase 1 National CARTS Release 37C	September 2013
TAMR Phase 1 complete IOC at 2nd site	January 2014
TAMR Phase 1 complete IOC at 26th site	December 2017
TAMR Phase 1 complete IOC at 39th site	March 2019
TAMR Phase 1 complete IOC at last (48th) site	February 2020
TAMR PHASE 3 SEGMENT 1	
TAMR Phase 3 Segment 1 Authorization to Proceed	December 2010
TAMR Phase 3 Segment 1 Contract Award - 11 STARS Systems (NTE)	December 2010
TAMR Phase 3 Segment 1 FID	December 2011
TAMR Phase 3 Segment 1 first site hardware delivery	April 2012
TAMR Phase 3 Segment 1 complete installation and checkout of upgraded hardware for CARTS IIIE system at N90	May 2012
TAMR Phase 3 Segment 1 Contract Definitization	July 2012
TAMR Phase 3 Segment 1 complete IOC at key site on E1 - D10	May 2013
TAMR Phase 3 Segment 1 complete IOC at key site on E2 - D10	September 2014
TAMR Phase 3 Segment 1 complete Operational Readiness Demonstration (ORD) at key site on E2 - D10	July 2015
TAMR Phase 3 Segment 1 complete IOC at 5th site (M98)	October 2015
TAMR Phase 3 Segment 1 Software Build S6R4 (CARTS/STARS) Complete Planning Milestone	February 2016
TAMR Phase 3 Segment 1 complete IOC at last (11th) site (N90)	October 2016
TAMR Phase 3 Segment 1 complete ORD at last (11th) site (N90)	October 2017
TAMR PHASE 3 SEGMENT 2	
TAMR Phase 3 Segment 2 first site hardware delivery (ARTS IIE)	August 2013
TAMR Phase 3 Segment 2 complete STARS ELITE OT&E	February 2014
TAMR Phase 3 Segment 2 complete IOC at first site (ARTS IIE)	April 2014
TAMR Phase 3 Segment 2 complete IOC at 12th site (ARTS IIE)	December 2015
TAMR Phase 3 Segment 2 complete IOC at 34th site (ARTS IIE)	December 2016
TAMR Phase 3 Segment 2 complete IOC at 65th site (ARTS IIE)	December 2017
TAMR Phase 3 Segment 2 complete IOC at last (91st) site (ARTS IIE)	March 2019
TAMR Phase 3 Segment 2 complete ORD at last site	August 2019

NAS VOICE SYSTEM

The National Airspace System (NAS) Voice System (NVS) will replace decades-old analog technology with secure, digital Voice over Intranet Protocol (VoIP) technology. Current point-to-point voice-switching technology allows controllers to speak to aircraft within range of their nearby radio site. By contrast, NVS works over a secure FAA digital network and is not limited by geography. With the flip of a switch, NVS will allow voice traffic to move from one location to another, anywhere in the country.

NVS will take advantage of modern router-based telecommunications using the internal FAA Telecommunications Infrastructure (FTI) network. FTI's multi-layered security prevents unwanted access to the system while also providing a NAS-wide connection for voice systems.

TARGET USERS

- Air traffic controllers
- Pilots, including pilots of Unmanned Aircraft Systems (UAS)

EQUIPAGE REQUIREMENTS

Additional equipage not required for NAS users

OPERATIONAL CAPABILITIES

- The FAA will deploy NVS in air traffic control towers, and Terminal Radar Approach Control (TRACON) and en route facilities, enabling the FAA to route and share air-ground voice assets between one facility and another.
- Air traffic managers will be able to monitor the status of each of the voice system nodes across the NAS from a central location, allowing them to make better traffic flow decisions in the event of a failure in a particular region.
- The FAA will have the flexibility to shift workload among many different air traffic control facilities, if needed, offering greater resiliency and increased capacity during unexpected events or poor weather conditions.
- NVS will help support the emerging requirements for UAS in the NAS, including improving the efficiency and reliability of exchanges between UAS flight crews and air traffic control.
- NVS will support airspace redesign, dynamic resectorization and offloading, and business continuity planning to protect against a loss of communications at air traffic control facilities during unplanned events.

IMPLEMENTATION

Engineers completed a critical design review of the software and hardware that make up NVS in June 2015, clearing the way for the FAA to move forward with the testing phase.

NVS will undergo factory and site testing, as well as evaluation at the FAA's William J. Hughes Technical Center in Atlantic City, New Jersey. The FAA has identified the Seattle en route center, TRACON and tower as key test sites going forward.

In 2016, the FAA will begin developing procedures for factory acceptance testing, where all features of the system will be assessed. Operational testing and evaluation, and key site testing are slated for completion in 2019. When NVS production systems are certified and operational deployment approval is achieved, the FAA will begin installing them in terminal and en route facilities in the 2020–2027 timeframe.

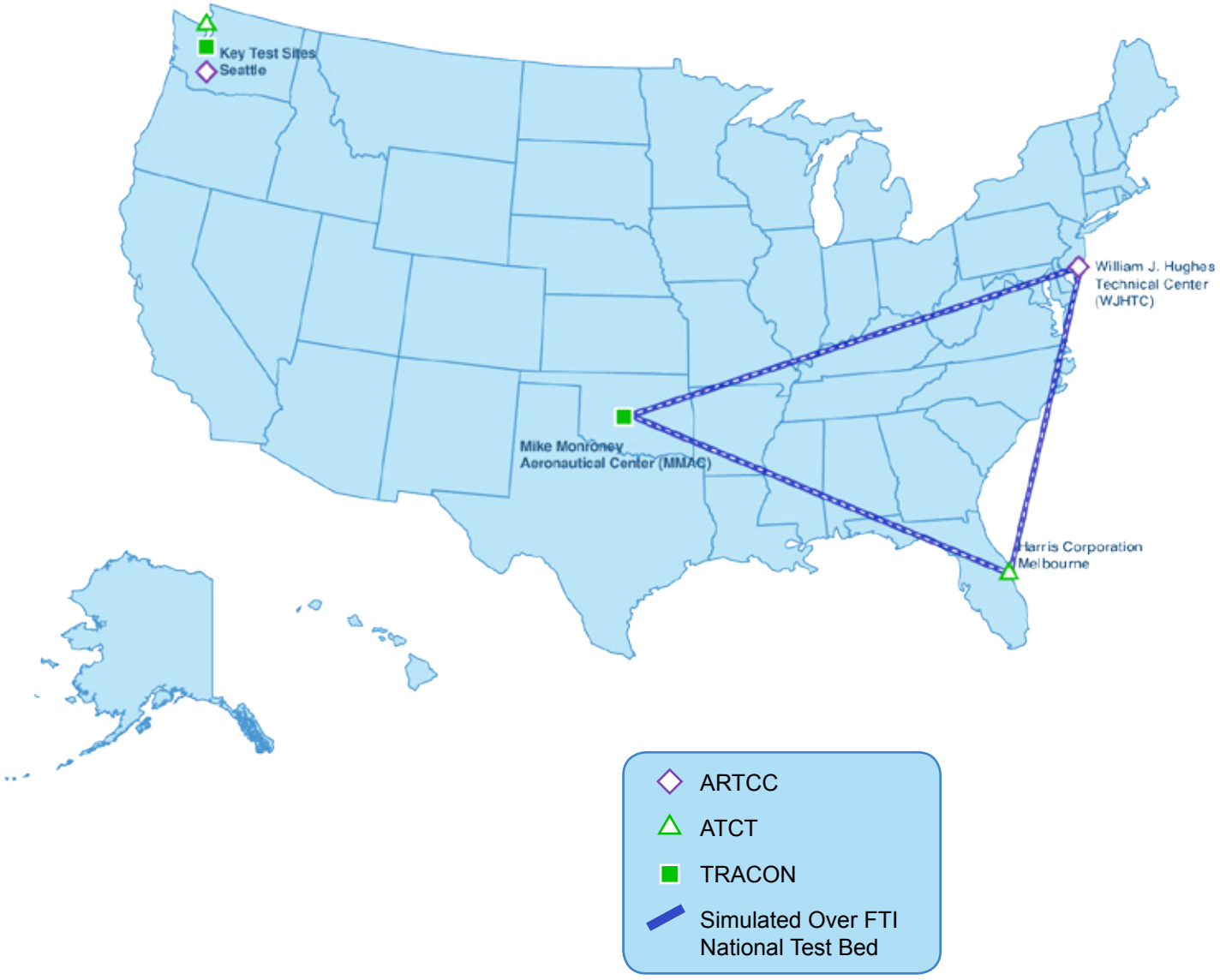
BENEFITS ACHIEVED TO DATE

Not applicable, capability still in development.

PROGRAM MILESTONES	DATE
NVS Contract Award	August 2012
NextGen Validation and Demonstrations Completed	January 2014
Preliminary Design Review completed	July 2014
Achieve NVS Final Investment Decision (FID) for Qualification Phase	September 2014
Critical Design Review completed	June 2015
Achieve NVS FID for Deployment Approval of Operational Systems	September 2017
Functional and Physical Configuration Audits completed	October 2017
Contractor Acceptance Inspection of Equipment at key sites	March 2019
Operational Test and Evaluation completed	May 2019
Key sites Initial Operating Capability	September 2019
In-Service Decision	March 2020
Production and Deployment of NVS Operational Systems	2020–2027

NAS VOICE SYSTEM

As of May 2016



SYSTEM WIDE INFORMATION MANAGEMENT

System Wide Information Management (SWIM) is the digital data-sharing backbone of NextGen. SWIM infrastructure enables air traffic management-related information sharing among diverse, qualified systems. The platform offers a single point of access for aviation data, with producers of data publishing once and users accessing the information they need through a single connection. It enables increased common situational awareness throughout the National Airspace System (NAS) and improves the FAA's ability to securely deliver the right information to the right people at the right time.

TARGET USERS

- Air traffic controllers
- Operators, including airlines, cargo carriers, business jet operators and airports

EQUIPAGE REQUIREMENTS

Minimal equipage is required for NAS users.

OPERATIONAL CAPABILITIES

- The SWIM Terminal Data Distribution System (STDDS) converts raw surface data from airport towers into accessible information. It shares the picture being seen by controllers in the air traffic control tower with controllers in the corresponding Terminal Radar Approach Control (TRACON) facility.
- NAS Enterprise Messaging Services (NEMS) is the information sharing infrastructure that enables the publication and sharing of NAS data. NEMS nodes enable increased security capabilities and the ability for consumers to self-manage data subscriptions.
- The SWIM Flight Data Publication Service (SFDPS) transforms En Route Automation Modernization flight, track, airspace and operational data from legacy into XML formats. SFDPS publishes data through NEMS using the Flight Information Exchange Model (FIXM) with a globally unique identifier. It will ensure consistency of data across the NAS via a common standard and by consolidating flight data previously maintained by multiple systems into a common repository. SFDPS also makes information available to airlines and airports through SWIM messaging services.
- The FAA Notices to Airmen (NOTAM) Distribution Service makes digital NOTAM data available through an additional channel, the publication and distribution capabilities of SWIM.
- The SWIM Identity and Access Management (IAM) service provides secure digital credentials for NAS messaging and web services. In alignment with the National Strategy for Trusted Identities in Cyberspace, IAM provides authentication and authorization services that ensure secure information sharing with FAA partners.

IMPLEMENTATION

All Segment 1 milestones were achieved on time and within budget. The program finished implementation in September 2015. SWIM Segment 2 consists of two parts.
Segment 2a (2015)

- Adds new capabilities to NEMS including TBFM and the SWIM Flight Data Publication Service.
- Adds NEMS nodes to all remaining en route centers.
- Increases security capabilities with improved access management.
- Enables consumers to self-manage data subscriptions.
- Enriches the set of traffic flow data for external consumers to maintain common situational awareness of the NAS.

Segment 2b (2016) builds upon the infrastructure foundation laid by Segment 2a, and

- Increases and improves products from SFDPS
- Increases the security of NAS data flows with identity verification and access management that provides a certificate management service to enable more secure data exchanges with outside partners
- Builds upon the monitoring capability of the existing infrastructure by adding status information about producers and consumers creating end-to-end situational awareness of all elements and participants in an information exchange
- Adds more terminal data to the list of STDDS published information and enriches the functionality of existing services
- Adds new data query functionality with NAS Common Reference, which supports complex data queries for NAS flight weather and aeronautical information
- Enables the global harmonization of information standards, including the Aeronautical Information Exchange, Weather Information Exchange and FIXM

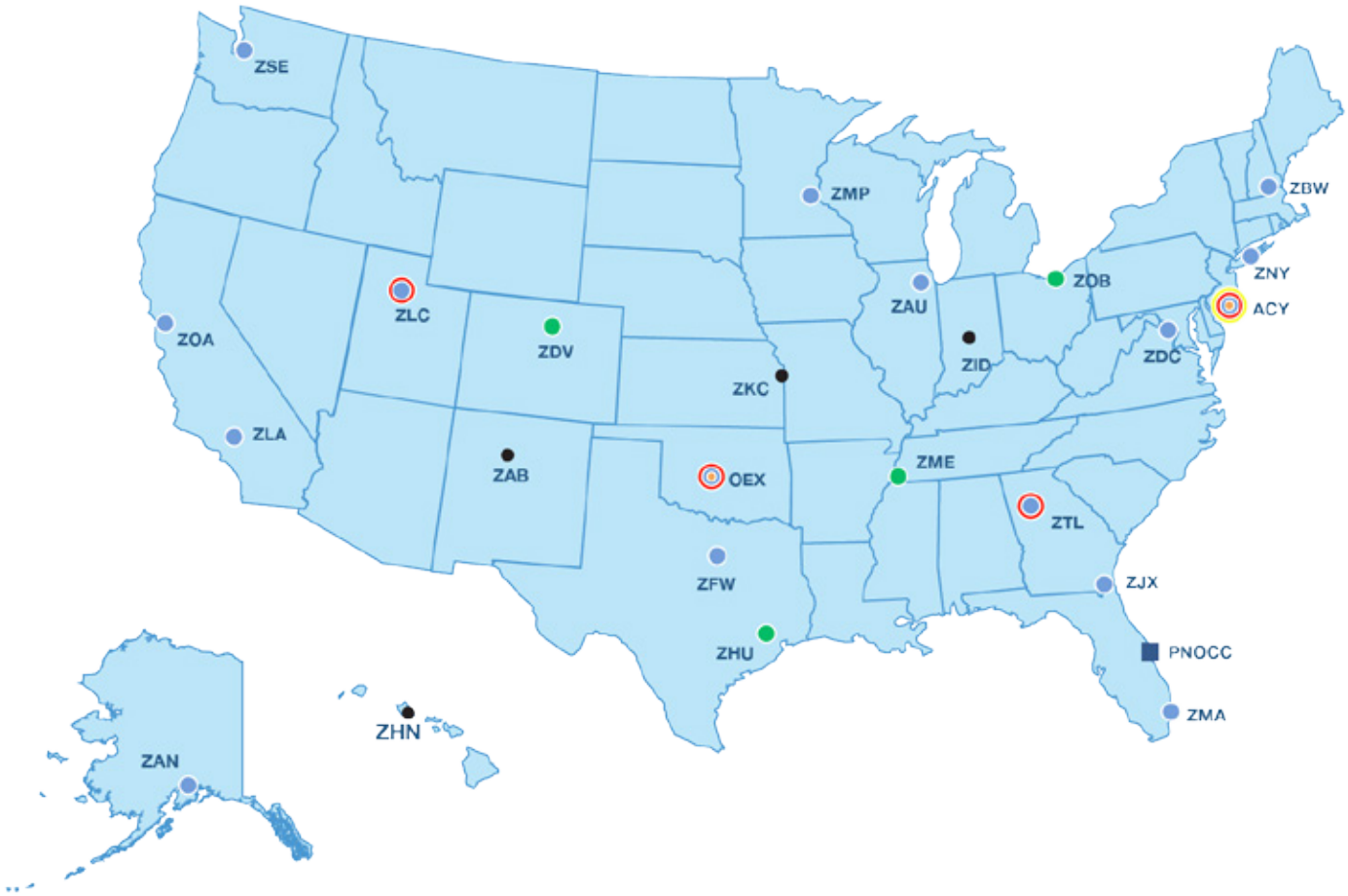
BENEFITS ACHIEVED TO DATE

- STDDS is currently installed at 38 TRACONs. The TRACON makes information available to airlines and airports through SWIM messaging services. STDDS provides surface data to the Traffic Flow Management System, which traffic managers use to balance traffic demands with capacity across the NAS. Using SWIM data, traffic managers can better calculate end-to-end flight trajectories. In August 2013, Miami TRACON became the first facility to begin distributing data from towers in its coverage area to an airline via STDDS.
- The FAA has installed the SWIM Surface Visualization Tool (SVT) at the Air Traffic Control System Command Center and the Southern California, Northern California, Potomac, New York, Chicago, Houston, Boston and Louisville TRACONs. It is also deployed to the Los Angeles and New York centers. The SVT deployment to these sites supports the Terminal Flight Data Manager early implementation strategy. The SVT makes it easy for TRACON controllers to spot departure congestion and anticipate changes — such as switching operational runways in response to changing weather conditions.
- NEMS connection points are deployed to 16 of the 20 en route centers for internal messaging. External messaging capabilities are provided by eight NEMS gateways deployed to four sites — Atlantic City, Oklahoma City, Salt Lake City and Atlanta. Mission support capabilities are provided by two NEMS nodes deployed in Atlantic City and Oklahoma City.

SWIM INFRASTRUCTURE DEPLOYMENT

NAS ENTERPRISE MESSAGING SERVICE (NEMS)

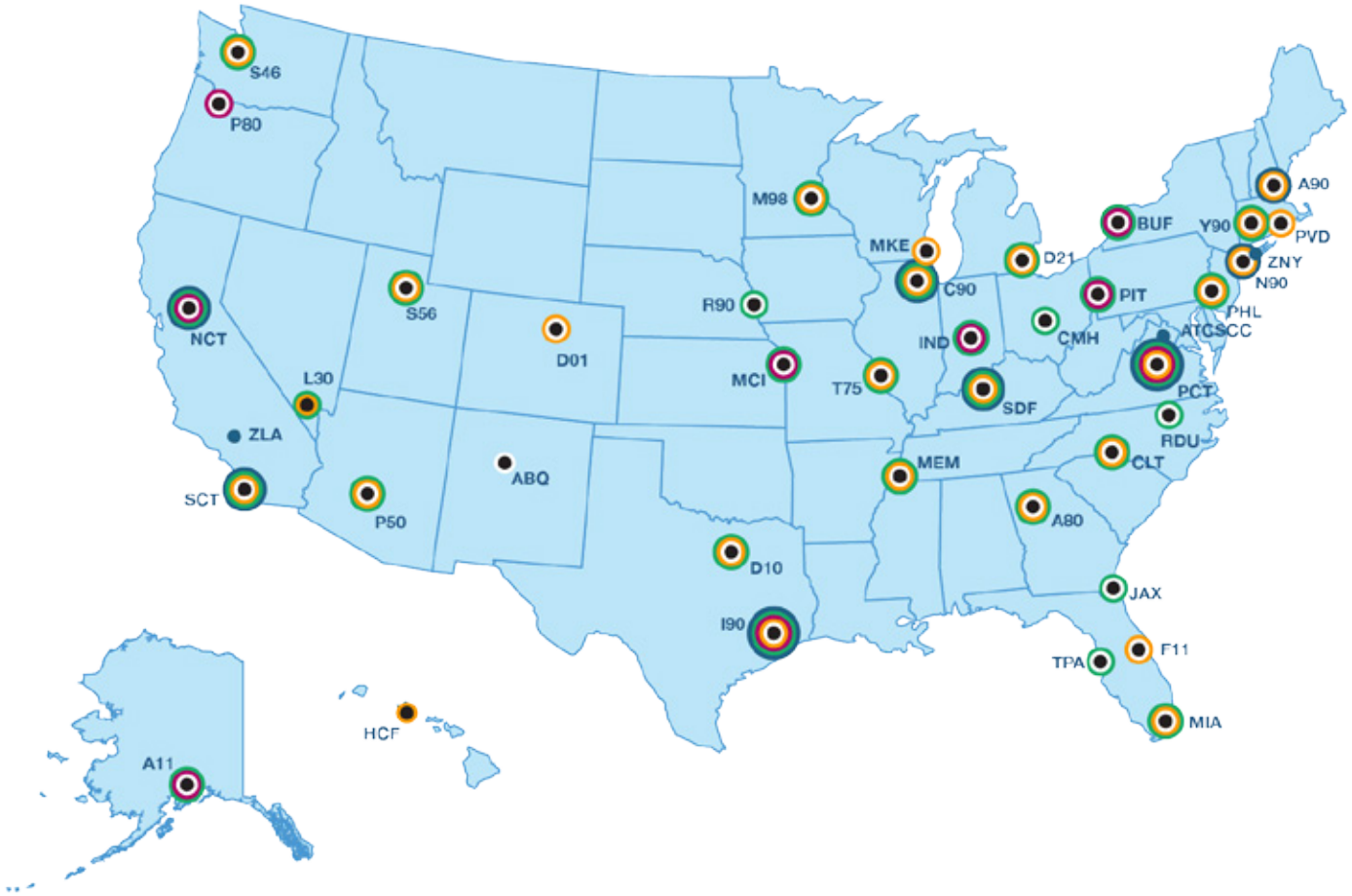
As of May 2016



SWIM TERMINAL DATA DISTRIBUTION SYSTEM

(STDDS) BY TRACON

As of May 2015



- Tower Data Link Services (TDLS)
- Runway Visual Range
- Airport Surface Detection Equipment–Model X
- Airport Surface Surveillance Capability
- Electronic Flight Strip Transfer System
- STDDS Completed Installation

PROGRAM MILESTONES	DATE
SEGMENT 1	
SWIM Segment 1 Final Investment Decision (FID)	July 2009
SWIM Segment 1 Corridor Integrated Weather System (CIWS) Publication operational – SWIM Implementation Programs (SIP) = CIWS	September 2010
SWIM Segment 1 Special Use Airspace (SUA) Automated Data Exchange operational - SIP=Aeronautical Information Management (AIM)	December 2010
SWIM Segment 1 Integrated Terminal Weather Service (ITWS) Publication operational - SIP=ITWS	January 2011
SWIM Segment 1 Reroute Data Exchange operational - SIP=Traffic Flow Management (TFM)	June 2011
SWIM Segment 1 Terminal Data Distribution operational - SIP=SWIM Terminal Data Distribution System (STDDS)	March 2012
SWIM Segment 1 Pilot Report Data Publication operational - SIP=Weather Switching Center Replacement (WMSCR)	June 2012
SWIM Segment 1 Flight Data Publication - Initial Flight Data Services operational - SIP=En Route Automation Modernization	December 2012
Miami TRACON distributes data to airline via STDDS	August 2013
Complete NextGen Capabilities Packages	September 2013
SWIM Segment 1 Operational Test and Evaluation complete - Flight Data Publication Service (FDPS) - SIP=FDPS	March 2014
SWIM Segment 1 Runway Visual Range (RVR) Publication Service operational - SIP=STDDS	June 2014
SWIM Segment 1 Flow Information Publication operational - SIP=TFM	December 2014
SWIM Segment 1 Flight Data Publication operational - SIP=FDPS	July 2015
SWIM Segment 1 SWIM Tool Kits (Core Services) - complete implementation	September 2015
SEGMENT 2A	
SWIM Segment 2a Authorization to Proceed	November 2010
SWIM Segment 2a FID for SWIM Segment 2a Planning Milestone	July 2012
SWIM Segment 2a complete SWIM NAS Enterprise Messaging Service (NEMS) Demand Assessment and Associated Deployment of new NEMS Nodes - Phase I	April 2013
SWIM Segment 2a complete NEMS Dynamic Subscription Capability Development	June 2013
SWIM Segment 2a complete on-ramping of ITWS using SWIM NEMS	June 2013
SWIM Segment 2a complete NEMS Web Services Capability development	June 2013
SWIM Segment 2a complete on-ramping of CIWS and WMSCR using NEMS	September 2013
SWIM Segment 2a complete Enhanced Weather Information Network Server (EWINS) using SWIM NEMS	November 2013
Complete on-ramping of EWINS using SWIM NEMS	November 2013
SWIM Segment 2a complete NEMS Demand Assessment and Associated Deployment of new NEMS Nodes - Phase II	April 2014
SWIM Segment 2a complete on-ramping of Time Based Flow Management using SWIM NEMS	April 2014
Complete on-ramping of AIM SUA using SWIM NEMS	September 2014
SWIM Segment 2a complete NEMS Security Services Capability development	February 2015
SWIM Segment 2a complete NEMS Demand Assessment and Associated Deployment of new NEMS Nodes - Phase III	April 2015
SWIM Segment 2a complete NEMS Demand Assessment and Associated Deployment of new NEMS Nodes - Phase IV	April 2016
SWIM Segment 2a completion	December 2017

SEGMENT 2B	
SWIM Segment 2b FID for SWIM Segment 2b Planning Milestone	October 2015
SWIM Segment 2b complete Initial Operating Capability (IOC) for Strong Authentication using digital certificates for internal connections between NAS systems (Identity Access management [IAM] Phase 2)	October 2017
SWIM Segment 2b complete Enterprise Service Monitoring (ESM) Phase 2 IOC	March 2018
SWIM Segment 2b complete ESM Phase 3 IOC	February 2020
SWIM Segment 2b complete NAS Common Reference IOC	March 2020
SWIM Segment 2b complete IOC for Attribute Based Access Control (Authorization) Capability (IAM Phase 2)	July 2020
SWIM Segment 2b STDDS Phase 2 Release 6 IOC	September 2021

NEXTGEN PORTFOLIOS

IMPROVED SURFACE OPERATIONS

Improved Surface Operations will improve safety, efficiency and flexibility on the airport surface by implementing new traffic management capabilities for pilots and controllers using shared surface movement data. The capabilities in the portfolio address surface movement and the exchange of information between controllers, pilots and air traffic managers that occur for departing aircraft from the gate to departure, and for arrivals from the runway to the terminal gate.

The increments in this portfolio will achieve success by tracking the movement of surface vehicles and aircraft, incorporating the movement data into the airport surveillance infrastructure and sharing the information with controllers, pilots and airline operations managers.

TARGET USERS

- Air traffic controllers
- Operators
- Airports

TARGET AREAS

Surface, terminal, en route

ANTICIPATED BENEFITS

FLEXIBILITY

Capabilities in this portfolio will improve the timely exchange of data to enable aircraft operators to more accurately adjust their departure and arrival times for the most efficient use of available runways, taxiways and gates:

- Permits taxi operations to occur that support low visibility operations for takeoff, improving access during those times
- Reduces effects of weather-related delays

EFFICIENCY

Capabilities in this portfolio improve efficiency:

- Enable more effective scheduling that includes runway, departure fix and traffic flow management of ground-management constraints, with automatic reassessment and update of the departure schedule based on the ability of departing flights to meet the designated departure schedule
- Enhance the ability to react to changing airport conditions, such as severe weather, by issuing digital departure clearances — including routing revisions using Data Communications (Data Comm)

- Improve awareness of surface congestion at major hub airports, greatly streamlining the coordination of corrective action and improving the resilience of the system
- Reduce fuel burn and operating costs related to long departure queues
- Reduce delays by improving event data quality and adherence to controlled departure times
- Reduces FAA operating costs through the use of Advanced Electronic Flight Strips

SAFETY

Capabilities in this portfolio enhance safety on the airport surface by improving pilot and controller awareness of surface traffic through ground-based automation, data distribution and flight deck capabilities.

Enhancements to the Aviation Safety Information Analysis and Sharing system will support NextGen with in-depth analysis of safety data from industry and government sources:

- Identifying existing or prospective operational risks in the National Airspace System
- Revealing potential improvements for efficiency and capacity

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FUNDING

SUPPORTED BY AIRPORT SURFACE SURVEILLANCE CAPABILITY

OI 102406 – Provide Full Surface Situation Information

SUPPORTED BY AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST

OI 102406 – Provide Full Surface Situation Information

SUPPORTED BY NEXTGEN DATA COMM

OI 104208 – Enhanced Departure Flow Operations

SUPPORTED BY NEXTGEN IMPROVED SURFACE OPERATIONS PORTFOLIO

OI 104209 – Initial Surface Traffic Management
OI 104211 – Surface Traffic Management

IMPROVED SURFACE OPERATIONS

	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Surface Tactical Flow	Airspace Technology Demonstration 2		Concept development and validation for Terminal Flight Data Manager (TFDM)	
TFDM	Business Case development and Acquisition Management System work for TFDM – FID targeted for Q3 FY 2016			
Implementation Phase:				
TFDM Early Implementation	Early Implementation Scope includes Electronic Flight Strip Transfer System (EFSTS) technology refresh, Advanced Electronic Flight Strips deployment, Traffic Flow Management System modifications to extend flight operator data exchange, Surface Visualization Tool deployment			
Increments implemented: • 104209-17 Surface Situational Awareness for Traffic Management • 104211-23 Electronic Flight Data Exchange[1]				
Airport Surface Surveillance Capability (ASSC)	ASSC operational at SFO in Q1 FY 2017 and at CLE in Q3 FY 2017. At other ASSC locations, safety analysis identified the need for changes to ensure controllers have a complete picture of the surface; future sites TBD			
Increment implemented: • 102406-12 Expansion of Surface Surveillance				
Data Communications (Data Comm)	Departure Clearance (DCL) 1st Site Initial Operating Capability (IOC) Q4 FY 2015	DCL deployment through FY 2019 – achieve last site IOC in FY 2019		

Concept *Development* *Operation*

† **NextGen Advisory Committee/NextGen Integration Working Group Commitment**

IMPROVED SURFACE OPERATIONS

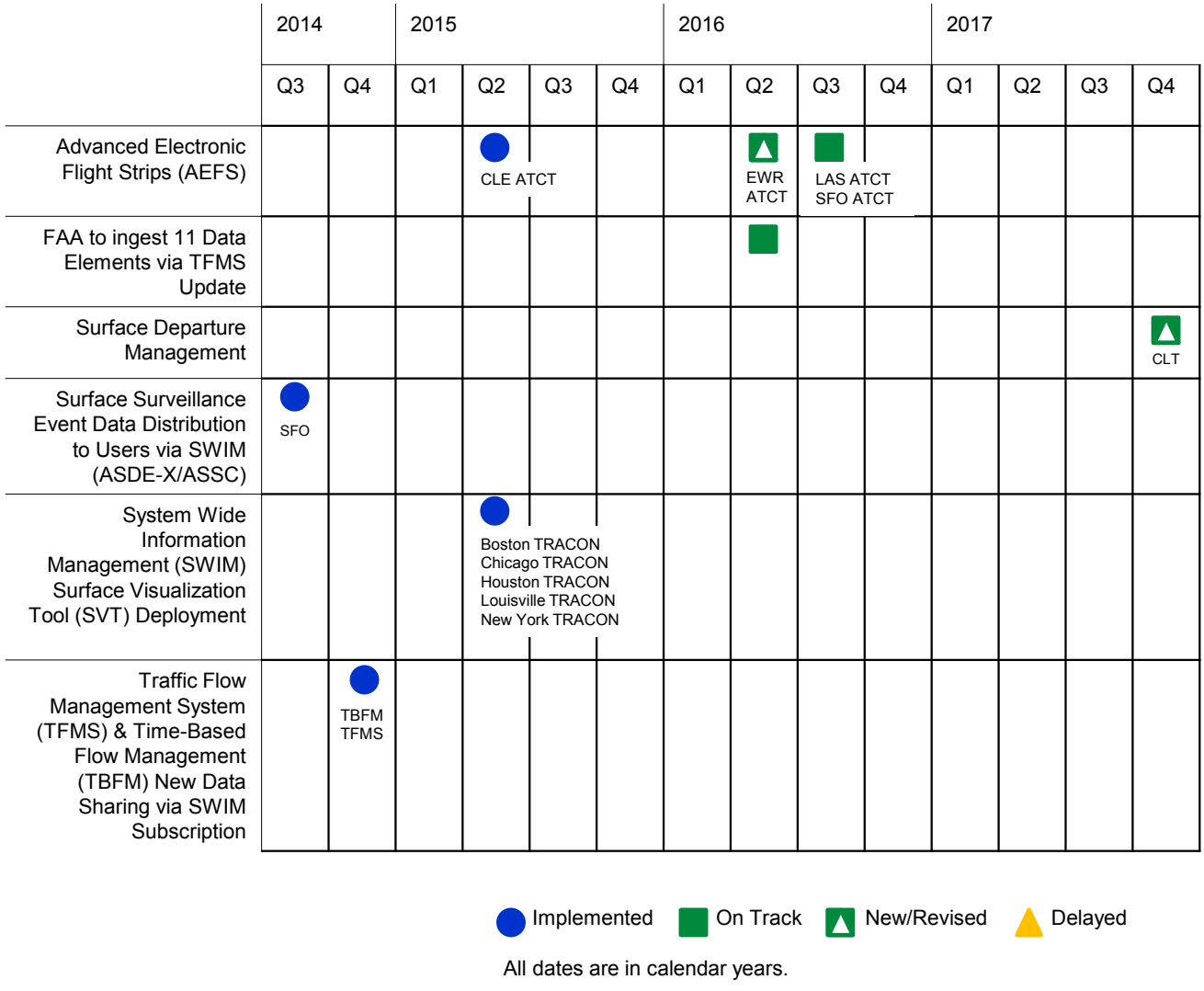
	FY 2015	FY 2016	FY 2017	FY 2018+
Increment implemented: 104208-12 Revised DCL via Data Comm				
TFDM (Segment 1 and 2)		Development to begin following FID in Q4 FY 2015		Build 1 Initial Operating Capability in FY 2022+
Increment implemented: • 104211-21 TFDM Scheduler/Sequencer[1] • 104211-22 Departure Reservoir Management[2] • 104211-23 Electronic Flight Data Exchange[3]				

Concept Development Operation

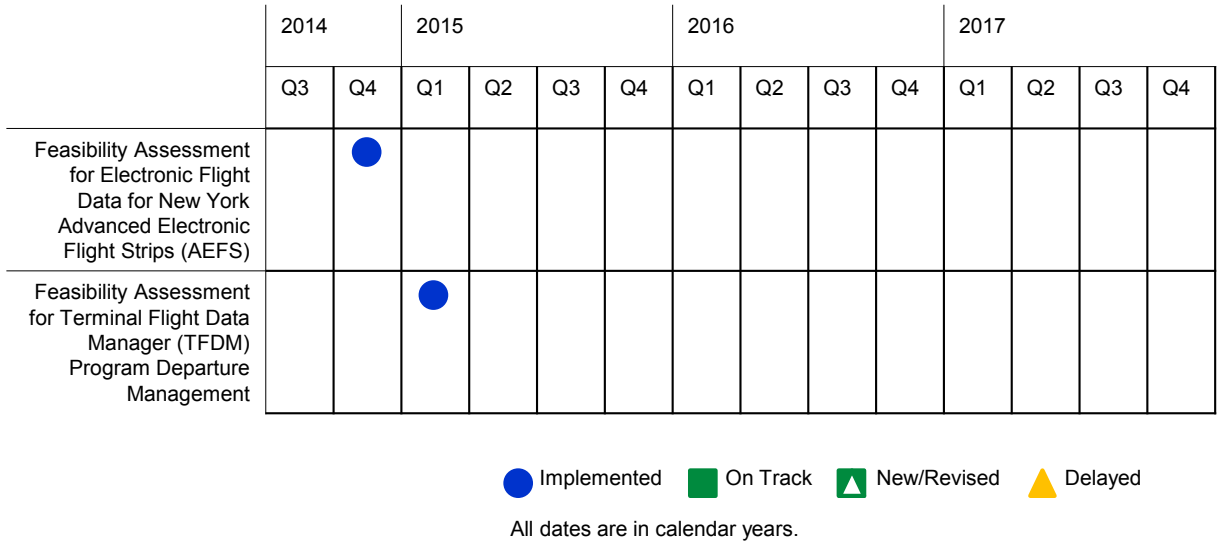
† NextGen Advisory Committee/NextGen Integration Working Group Commitment

Some of the greatest efficiencies can be gained while an aircraft is still on the ground. The FAA commits to implementing near-term surface improvements, sharing more data with stakeholders and completing feasibility assessments of other capabilities of interest. The goal of these enhancements is to measurably increase predictability, and provide actionable and measurable surface efficiency improvements. These commitments are a subset of the overall series of programs and activities the FAA is planning to improve operations in these domains.

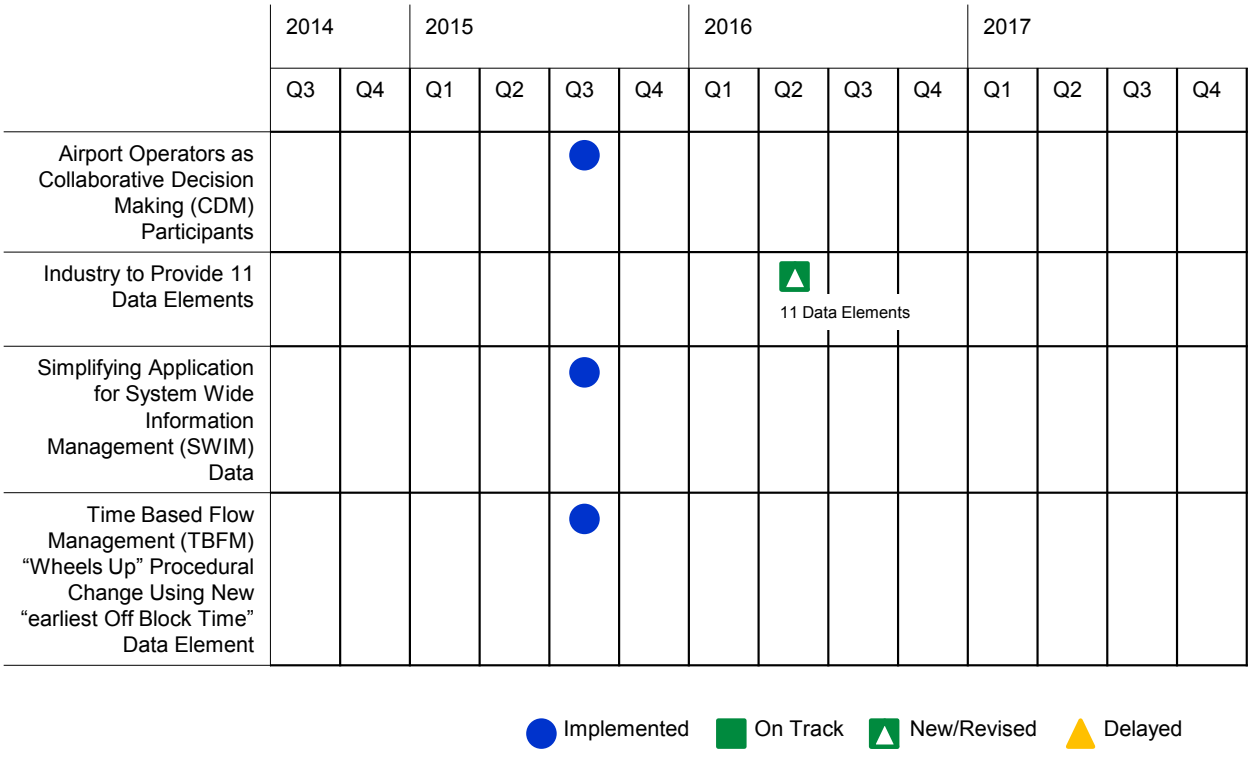
NEXTGEN PRIORITIES JOINT IMPLEMENTATION COMMITMENTS



NEXTGEN PRIORITIES JOINT PRE-IMPLEMENTATION COMMITMENTS



NEXTGEN PRIORITIES JOINT INDUSTRY COMMITMENTS



IMPROVED APPROACHES AND LOW-VISIBILITY OPERATIONS

Improved Approaches and Low-Visibility Operations include capabilities designed to increase airport approach and arrival access and flexibility. This will be accomplished through a combination of procedural changes, improved aircraft capabilities and improved precision approach guidance.

The procedural changes allow for more efficient flight tracks which lead to reduced fuel use and emissions, while keeping aircraft safely separated through the use of Optimized Profile Descents (OPD). The Enhanced Flight Vision System (EFVS) and other similar flight deck capabilities provide access to more runways when visibility is low, resulting in increased throughput and reduced delay. Ground Based Augmentation Systems (GBAS) will provide improved precision-approach guidance to flight crews and will enhance satellite navigation capabilities.

The increments in this portfolio will achieve success through a combination of effective procedure design and implementation, air traffic controller training, and aircraft equipage and approval. Some increments also require installation and certification of ground infrastructure.

TARGET USERS

- Air traffic controllers
- Pilots

TARGET AREAS

Terminal

ANTICIPATED BENEFITS

ACCESS

Capabilities in this portfolio provide greater access to airports (approach and landing) during periods of low visibility or low-cloud ceiling, through the use of:

- Global Navigation Satellite Systems
- Required Navigation Performance procedures
- EFVS
- Other flight deck technologies

EFFICIENCY

The use of OPDs will lead to fuel efficiency benefits:

- Meets the airspace design objective of separating different flows of traffic
- Enables more efficient descent profiles that reduce level-offs and engine power-ups

ENVIRONMENT

Capabilities in this portfolio will, where feasible:

- Enable equipped aircraft to fly precise and more fuel-efficient vertical and horizontal paths from high-altitude airspace down to the runway
- Save time, fuel and emissions while allowing for the potential to limit flight over environmentally sensitive areas

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FUNDING

SUPPORTED BY OPERATIONS APPROPRIATIONS

OI 107115 – Low-Visibility/Ceiling Takeoff and Departure Operations

OI 107117 – Low-Visibility/Ceiling Approach and Landing Operations

OI 107202 – Low-Visibility Surface Operations

SUPPORTED BY NEXTGEN IMPROVED MULTIPLE RUNWAY OPERATIONS PORTFOLIO

OI 107107 – GBAS Precision Approaches

IMPROVED APPROACHES AND LOW-VISIBILITY OPERATIONS

	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Ground Based Augmentation Systems (GBAS)	Category (CAT) II/III Standards Validation development work		CAT II/III Non-Federal Approval development work	
Synthetic Vision Guidance System (SVGS) for Approach	Work supports post FY 2016 capabilities			
Enhanced Flight Vision System (EFVS) for Landing		Work supports post FY 2016 capabilities of Aircraft and Operations Approval		
EFVS	EFVS Improved Low-Visibility Taxi development			
Implementation Phase:				
GBAS				GBAS CAT II/III Standards: Ground system design approval and validation
Increment implemented: • 107107-11 GBAS CAT I Non-Federal System Approval • 107107-21 GBAS CAT II/III Standards *Note: The GBAS CAT I/II/III validation provides approval for non-federal acquisition and use of the GBAS CAT I/II/III systems. For this reason, the implementation strategy beyond the FAA approval is dependent on external acquisition and deployment of GBAS capability.*				
EFVS for Approach		Operationally available for suitably equipped operators		
Increment implemented: • 107117-11 EFVS for Approach				
SVGS for Approach			Operationally available for suitably equipped operators	
Increment implemented: • 107117-12 SVGS for Approach				

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

IMPROVED APPROACHES AND LOW-VISIBILITY OPERATIONS				
	FY 2015	FY 2016	FY 2017	FY 2018+
EFVS for Landing		Operationally available for suitably equipped operators		
Increment implemented: • 107117-13 EFVS for Landing				
Low Visibility Surface Operations		Operationally available for suitably equipped operators		
Increment implemented: • 107202-22 EFVS/Accurate Position Information for Taxi				

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

IMPROVED MULTIPLE RUNWAY OPERATIONS

Improved Multiple Runway Operations (IMRO) improves access to closely spaced parallel runways (CSPR). This will enable more arrivals and departures, which will increase efficiency and capacity at airports while reducing flight delays. The capabilities in this portfolio will enable the use of simultaneous approaches (two aircraft on the approach path at the same time) during periods of reduced visibility, decrease the required separation between aircraft on dependent approaches (staggered aircraft arrivals on parallel runways) and departure procedures, and deliver more runway throughput enhancing air traffic control wake turbulence mitigation procedures that normally require increased separation between aircraft in terminal airspace (airspace surrounding airports).

The increments in this portfolio will achieve success through the approval of procedures through authorization of FAA orders. After analysis is complete to determine the required procedure and separation standards, the FAA follows safety risk management processes for approval of the separation changes. Controller training and air carrier pilot advisory briefings are provided, as needed, prior to initiation of operational use of the procedures in the terminal environment.

TARGET USERS

- Air traffic controllers
- Pilots
- Airports

TARGET AREAS

Terminal

ANTICIPATED BENEFITS

ACCESS

Capabilities in this portfolio will improve access to parallel, intersecting and converging runways through new procedures, standards, guidance and decision support tools.

CAPACITY

This portfolio increases airport throughput capacity through the introduction of capabilities that:

- Safely reduce separation standards for closely spaced parallel operations, and make this capability available at additional airports

- Improve air traffic controller awareness of all relevant airborne traffic approaching runways that converge or intersect, or whose flight paths converge or intersect
- Reduce wait time between departures

FUNDING

SUPPORTED BY NEXTGEN IMRO PORTFOLIO

OI 102140 – Improved Wake Turbulence Mitigation for Departures

OI 102141 – Improved Parallel Runway Operations

OI 102144 – Wake Turbulence Mitigation for Arrivals: CSPRs

OI 102157 – Improved Parallel Runway Operations with Airborne Applications

IMPROVED MULTIPLE RUNWAY OPERATIONS

	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Closely Spaced Parallel Operations (CSPO): 1.0 nautical mile (nm) Dependent Stagger for Closely Spaced Parallel Runways (CSPR) spaced greater than 2,500 feet & less than 3,600 feet	Procedure design and authorization to be completed in FY 2015	Orders effective beginning FY 2015–FY 2016 at MSP, JFK, SEA, PDX, RDU, DAL and MEM†	Orders effective at SFO and BOS†	
CSPO: Simultaneous Dual Approaches with Offset	Procedure design and authorization to be completed in FY 2016	Order effective in FY 2016 at JFK†	Orders effective in FY 2017 at PDX, MSP and DTW†	
CSPO: Simultaneous Triple Approaches	Concept validation initiated in FY 2013 and planned for completion in FY 2015	Procedure design and authorization to be completed in FY 2016	Orders effective in FY 2017 at ATL and IAD†	
CSPO: Enable Additional Approach Options for New Independent Runway Separation Standards	Procedure design and authorization FY 2013–FY 2015			
CSPO: Simultaneous Approaches with High Update Rate Surveillance Required	Concept validation and analysis initiated in FY 2013 and planned for completion in FY 2018			
				Orders to be effective in FY 2022+
CSPO: Paired Approach for Category (CAT) I	Concept validation and analysis initiated in FY 2009 and planned for completion in FY 2018			
				Orders to be effective in FY 2020+
Implementation Phase:				
CSPO: 1.0 nm Dependent Stagger for CSPRs spaced greater than 2,500 feet & less than 3,600 feet		Procedures implemented beginning FY 2015–FY 2016 at MSP, JFK, SEA, PDX, RDU, DAL and MEM†	Procedures implemented at SFO and BOS†	

Concept | Development | Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

IMPROVED MULTIPLE RUNWAY OPERATIONS				
	FY 2015	FY 2016	FY 2017	FY2 018+
Increment implemented: • 102141-14: Amend Dependent Runway Separation Standards in Order 7110.65				
CSPO: Simultaneous Dual Approaches with Offset		Procedures implemented in FY 2016 at JFK†	Procedures implemented in FY 2017 at PDX, MSP and DTW†	
Increment implemented: • 102141-22: Amend Standards for Simultaneous Independent Approaches – Dual with Offset				
CSPO: Simultaneous Triple Approaches			Procedures implemented in FY 2017 at ATL and IAD†	
Increment implemented: • 102141-24: Amend Standards for Simultaneous Independent Approaches – Triple				
CSPO: Simultaneous Approaches with High Update Rate Surveillance Required				Procedures implemented in FY 2022+
Increment implemented: • 102141-23: Simultaneous Independent Closely Spaced Approaches – High Update Rate Surveillance Required				
CSPO: Paired Approach for CAT I				Procedures implemented in FY 2020+
Increment implemented: • 102157-21: Paired Approaches for Runways Spaced Less than 2,500 feet (CAT I)				

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

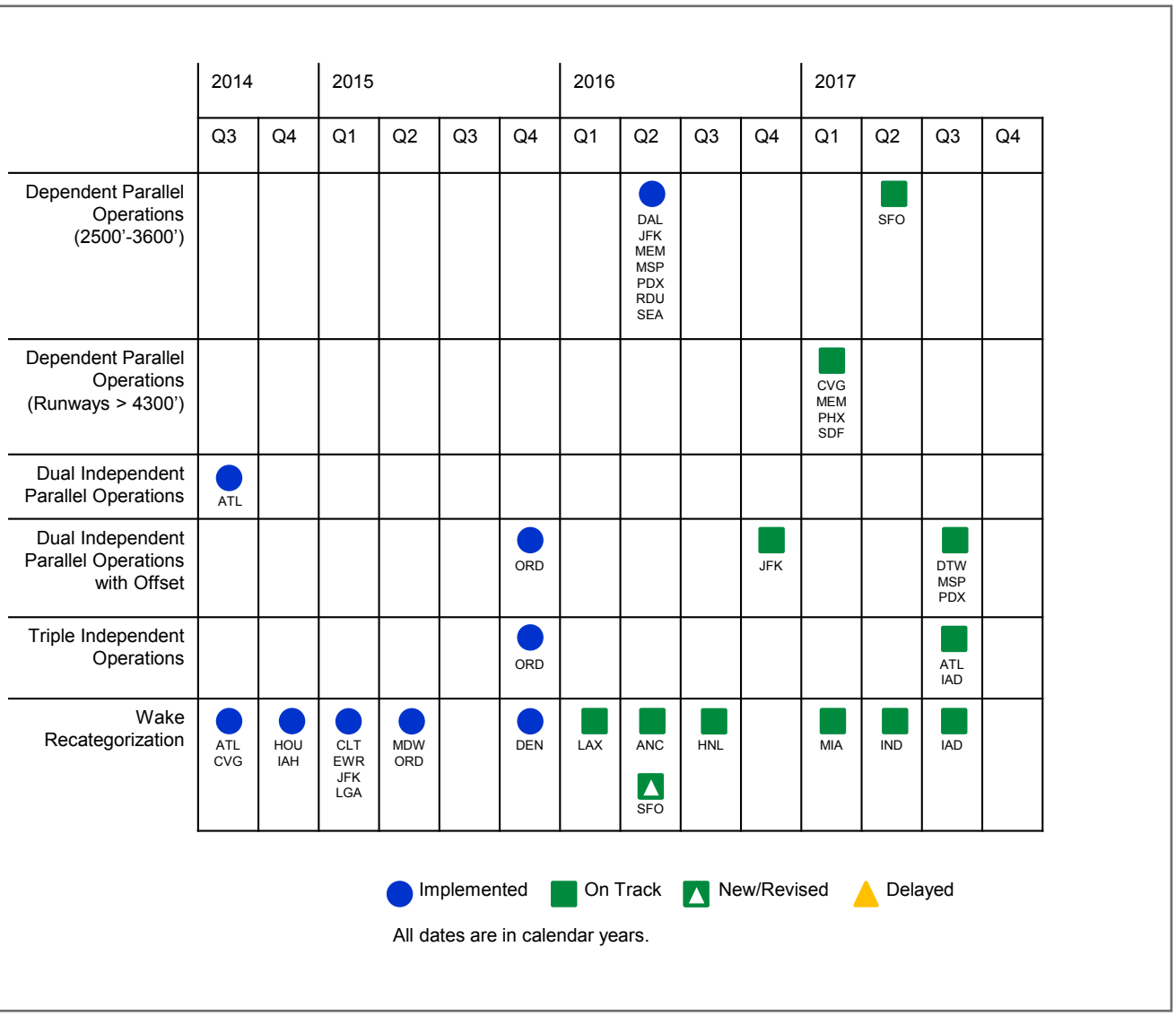
IMPROVED MULTIPLE RUNWAY OPERATIONS				
	FY 2015	FY 2016	FY 2017	FY 2018+
Pre- Implementation Phase:				
Wake Turbulence Mitigation for Departures (WTMD)	Benefits decision for WTMD to support implementation at BOS, EWR, MIA, SEA, DTW, STL and PHL†			
Wake Turbulence Mitigation for Arrivals - Procedure (WTMA-P)	SRMD approved and Order for DTW and PHL was signed May 2015. Safety analysis for ATL completed in FY 2015†			
Wake Turbulence Mitigation for Arrivals – Rear Gate				Work Supports Rear gate Analysis for Post FY 2020 Capability
Implementation Phase:				
WTMA-P			Orders effective starting in FY 2017 at PHL, ATL and DTW (pending addition of RNAV approach), with consideration to more sites pending safety and benefits analysis	
Increment implemented: • 102144-11: WTMA-P for Heavy/B757 Aircraft				

Concept Development Operation

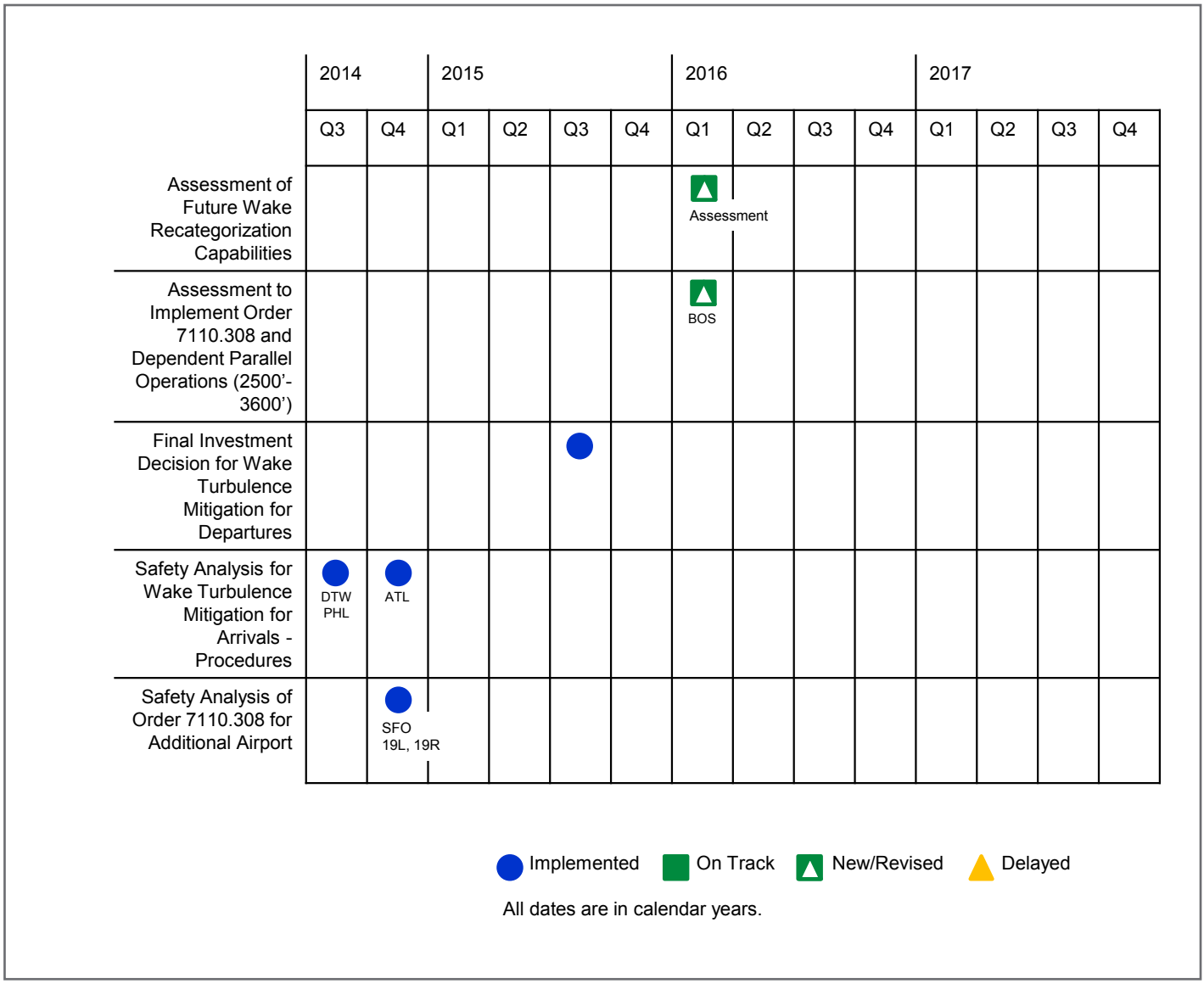
† NextGen Advisory Committee/NextGen Integration Working Group Commitment

The efficiency of parallel runways, particularly those that are closely spaced, has been limited by the interplay of wake vortices with nearby aircraft. Multiple Runway Operations capabilities improve access to these runways and can increase basic runway capacity and throughput by reducing separation between aircraft based on improved wake categorization standards. Improved access will enable more arrivals, departures, or both during less than visual meteorological conditions, which will increase efficiency and reduce flight delays. These commitments are a subset of the overall series of programs and activities the FAA plans to address.

NEXTGEN PRIORITIES JOINT IMPLEMENTATION COMMITMENTS



NEXTGEN PRIORITIES JOINT PRE-IMPLEMENTATION COMMITMENTS



PERFORMANCE BASED NAVIGATION

Performance Based Navigation (PBN) uses Area Navigation (RNAV) and Required Navigation Performance (RNP) to improve access and flexibility in the National Airspace System (NAS) with the goal of providing the safest and most efficient aircraft routes from departure runway to arrival runway.

PBN defines the performance requirements for routes and procedures that enable aircraft to navigate with greater precision and accuracy. It provides a basis for designing and implementing new flight paths, redesigning airspace and providing safe obstacle clearance. Progressive stages of PBN capabilities include the safe implementation of more closely spaced flight paths for departure, arrival and approach. The portfolio also looks to right-size the navigation assets in the NAS through reviews of procedures and infrastructure to determine whether they are still useful, require revision or can be removed.

The increments in this portfolio will achieve success through the development of high- and low-altitude routes, and navigation procedures in terminal airspace that allow for integrated operations connecting airports from runway to runway. New PBN operations will provide more direct flight operations while continuing to provide routing flexibility for operators and air traffic controllers. Procedures will be prioritized and implemented based on new FAA PBN orders. National standards for reduced separation and divergence, and vertical design guidance and criteria will be developed to further advance PBN capabilities. Teams are continuing work at several Metroplex[1] sites to study current operations, engage with communities on the scope of anticipated design and implementation, identify design improvements taking into account the FAA's environmental responsibilities under the National Environmental Policy Act and implement new procedures. This combination of separation standards, methods and new procedures reduce the dependency on ground-based navigation infrastructure.

TARGET USERS

- Air traffic controllers
- Pilots

TARGET AREAS

Selected areas of the NAS

ANTICIPATED BENEFITS

ACCESS

Capabilities in this portfolio provide improved benefits by defining navigation performance specifications for an aircraft along a route, during a procedure or in airspace. In addition, certain

[1] Metroplex is an effort to expedite PBN in large metropolitan areas that include several commercial and general aviation airports.

capabilities provide an access benefit to all qualified runway ends, especially for those not equipped with Instrument Landing Systems (ILS). It also provides a flexibility benefit at ILS airports by providing an alternative instrument approach to continue operations if the ILS fails.

- Optimization of arrival and departure vertical profiles
- Reductions in lateral track distances
- Repeatable, predictable flight paths

CAPACITY

Removing level-offs on arrivals, segregating arrival routes to deconflict flows, adding departure points, expediting departures, adding new high-altitude PBN routes and realigning airspace to enhance the NAS are improving capacity.

- Increased capacity in transition airspace for arrivals and departures
- Improved collaboration within and between air traffic control (ATC) facilities
- Improved opportunity for traffic flow managers to more fully exploit the use of available NAS resources

EFFICIENCY

Ensuring flights obtain the most efficient requested or assigned routing for which the flight is performance qualified, given the ATC situation, is promoting flight efficiency. RNAV- and RNP-equipped aircraft have access to performance-restricted routes without creating additional workload for controllers.

- Reduced ATC task complexity and pilot/controller communications due to reduced radar vectoring
- Reduced need for traffic management initiatives due to provision of additional exit points/earlier route divergence
- Reduced emissions and fuel burn through operational improvements

FUNDING

SUPPORTED BY NEXTGEN PBN-METROPLEX RNAV/RNP/PBN & METROPLEX PORTFOLIO/OPERATIONS APPROPRIATIONS

OI 108209 – Increase Capacity and Efficiency Using RNAV and RNP

SUPPORTED BY OPERATIONS APPROPRIATIONS

OI 107103 – RNAV Standard Instrument Departures, Standard Terminal Arrival Routes and Approaches

SUPPORTED BY SYSTEM DEVELOPMENT

OI 104123 – Time Based Metering Using RNAV and RNP Route Assignments

PERFORMANCE BASED NAVIGATION

	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Metroplex – Study Phase	Study Phase work began in FY 2011 at D.C. and North Texas Metroplexes and will continue across approximately 12 sites			
Metroplex – Design Phase	Design Phase work began in FY 2011 at D.C. and North Texas Metroplexes and will continue across approximately 12 sites			
Metroplex – Evaluation Phase	Evaluation Phase work began in FY 2012 at Houston and D.C. Metroplexes and will continue across approximately 12 sites			
Integration of National Airspace System (NAS) Design and Procedure Planning – Performance Based Navigation (PBN) Initiatives	Modeling, simulation and safety analysis for new Area Navigation (RNAV)/ Required Navigation Performance (RNP) procedure development			
Implementation Phase:				
Metroplex - Implementation Phase	Implementation Phase work began in FY 2013 at Houston Metroplex and will continue across approximately 12 sites			
Increments implemented: • 2015: Complete Northern California Metroplex implementation activities† • 2015: Complete Washington, D.C., Metroplex implementation activities • 2015: Complete North Texas Metroplex implementation activities • 2016: Complete Southern California Metroplex implementation activities • 2017: Complete Atlanta Metroplex implementation activities† • 2017: Complete Charlotte Metroplex implementation activities†				
Metroplex - Post Implementation Phase	Post Implementation Phase work began in Q3 of FY 2014 at Houston Metroplex and will continue across approximately 12 sites			
Increment implemented: • 108209-12 Metroplex PBN Procedures				

Concept Development Operation

† **NextGen Advisory Committee/NextGen Integration Working Group Commitment**

PERFORMANCE BASED NAVIGATION

	FY 2015	FY 2016	FY 2017	FY 2018+
Integration of NAS Design and Procedure Planning – PBN Initiatives			PBN Initiatives implementation complete at second location. Develop Established on RNP Widely Spaced Operation National Standard	
Increment implemented: • 108209-20 Advanced and Efficient RNP				
Implementation Phase:				
Transition to PBN Routing for Cruise Operations			Design a regional network of high altitude PBN routes on the eastern seaboard in airspace meeting criteria for establishment of route structure outlined in the PBN Route Structure Concept of Operations.	
Increment implemented: • 108209-14 Transition to PBN Routing for Cruise Operations				
RNAV (GPS) Approaches	Wide Area Augmentation System program			
Increment implemented: • 108209-19 RNAV (GPS) Approaches				

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

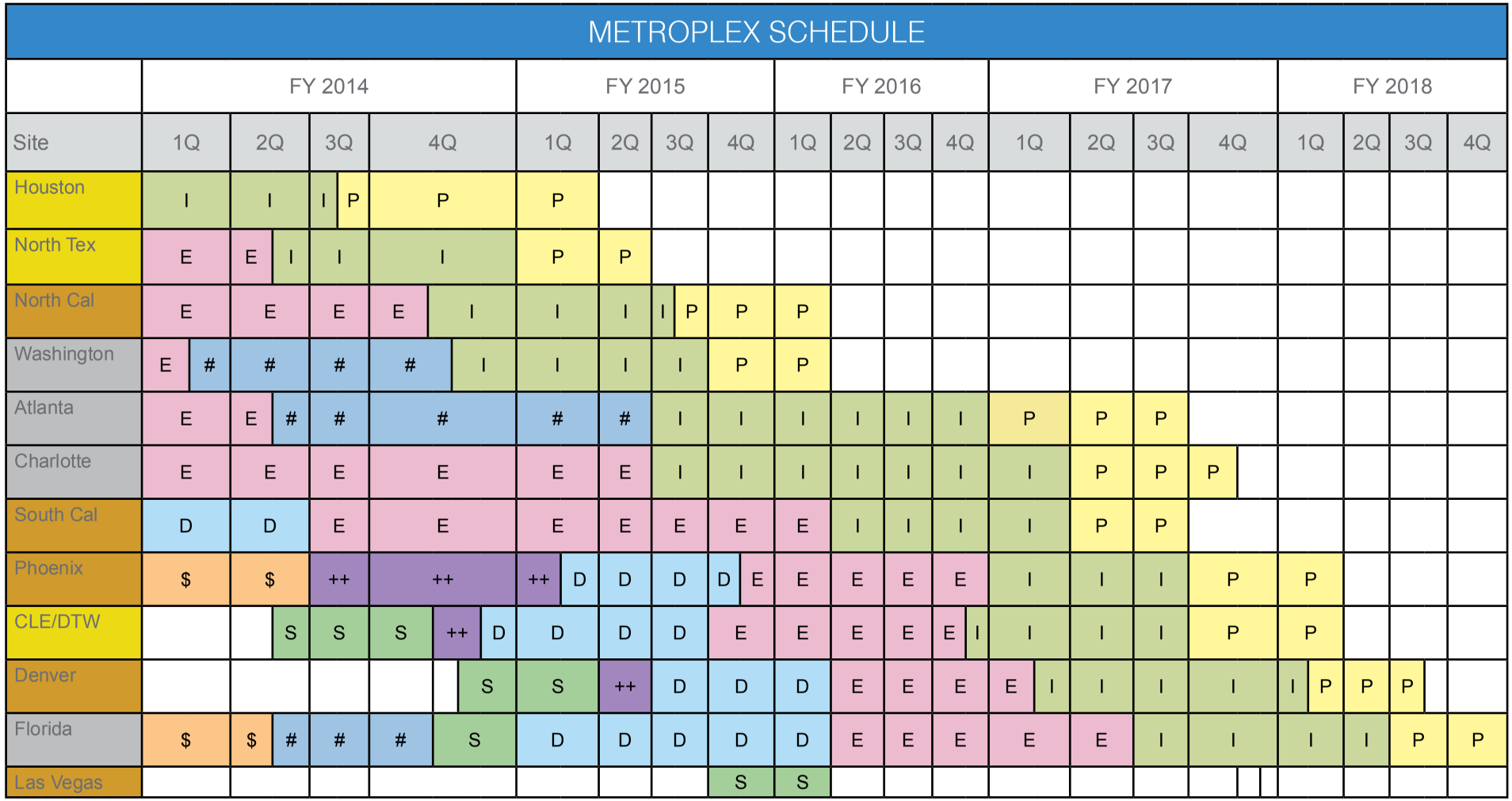
PERFORMANCE BASED NAVIGATION				
	FY 2015	FY 2016	FY 2017	FY 2018+
Equivalent Lateral Spacing Operations (ELSO)	Establish ELSO National Standard			After publication of air traffic control rule changes, implement at two additional locations as part of Metroplex or RNAV Standard Instrument Departure (SID) development activities.
Increment implemented: • 108209-21 ELSO				
RNP Authorization Required (AR) Approaches	Certify, publish and implement procedures outlined in H.R. 58 Section 213 a & b[1]			
Increment implemented: • 107103-12 RNP AR Approaches				
RNAV SIDs and Standard Terminal Arrivals (STAR) at Single Sites	Certify, publish and implement procedures outlined in H.R. 58 Section 213 a & b[2]			
Increment implemented: • 107103-13 RNAV SIDs and STARs at Single Sites				

[1,2] Procedure development will continue through FAAO 7100.41 process

Concept Development Operation

† **NextGen Advisory Committee/NextGen Integration Working Group Commitment**

METROPLEX SCHEDULE

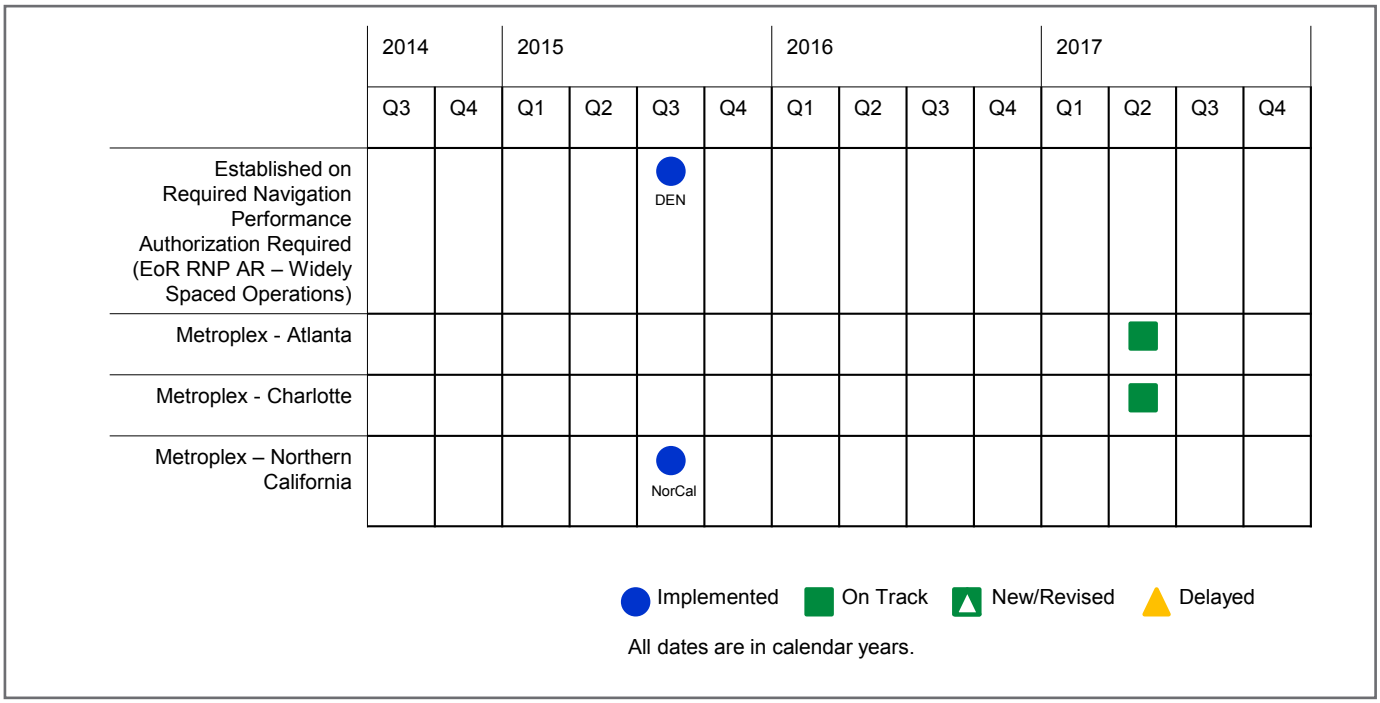


Milestone Leads Organizational Symbol	Functional Description
AJV-1	Airspace Services
AJV-121	Airspace Optimization Group
AJV-E	Mission Support, Eastern Service Center
AJV-C	Mission Support, Central Service Center
AJV-W	Mission Support, Western Service Center
AJV-114	Environmental Analysis
AJW-3	Aviation Systems Standards – Flight Checks

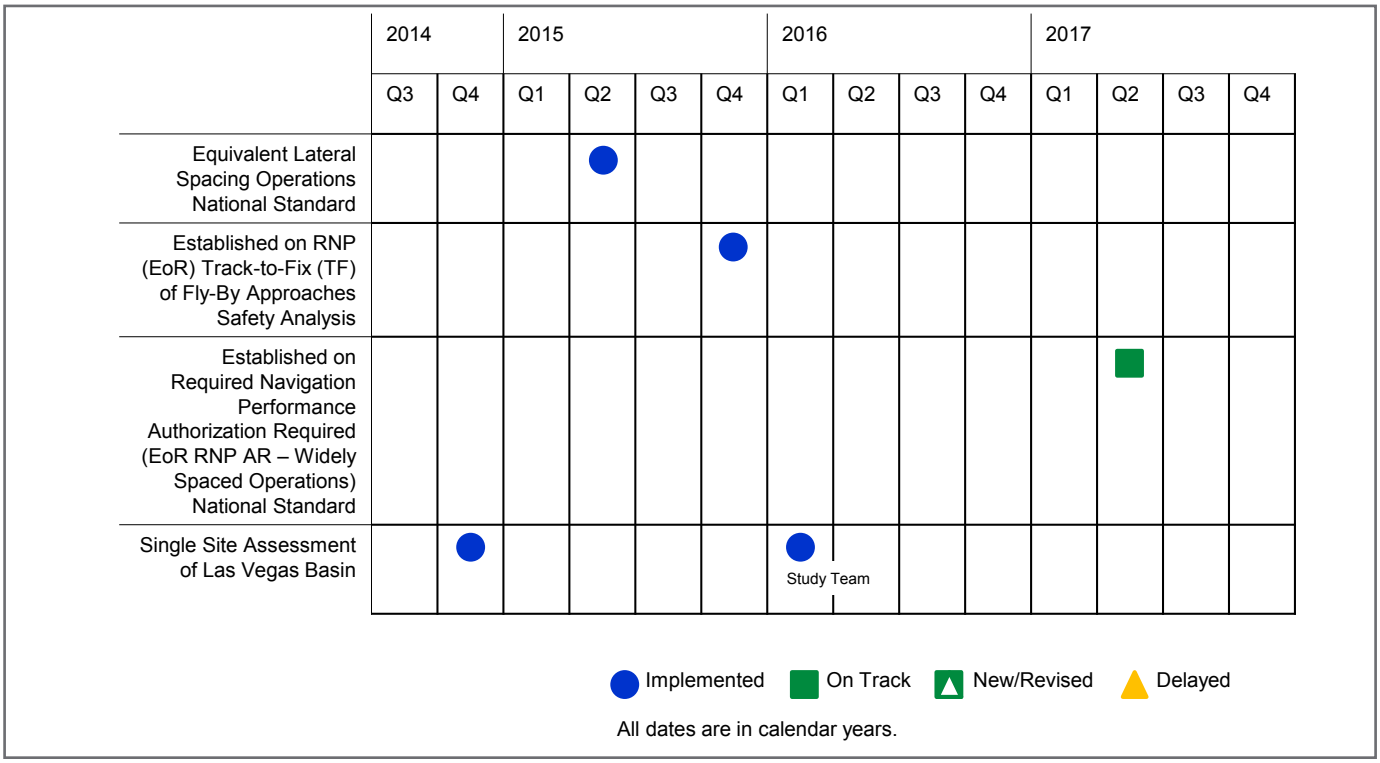
S	Study
D	Design
E	Evaluation
I	Implementation
P	Post Implementation
$	Budget Impact
#	ERAM Resource Impact
++	Facility Resource Issue

With PBN, the FAA delivers new routes and procedures that primarily use satellite-based navigation and onboard aircraft equipment to navigate with greater precision and accuracy. PBN provides a basis for designing and implementing automated flight paths, airspace redesign and obstacle clearance. Benefits include shorter and more direct flight paths, improved airport arrival rates, enhanced controller productivity, increased safety due to repeatable and predictable flight paths, fuel savings and a reduction in aviation's adverse environmental impact. These commitments are a subset of the overall series of PBN activities the FAA is planning to implement.

NEXTGEN PRIORITIES JOINT IMPLEMENTATION COMMITMENTS



NEXTGEN PRIORITIES JOINT PRE-IMPLEMENTATION COMMITMENTS



TIME BASED FLOW MANAGEMENT

Time Based Flow Management (TBFM) enhances National Airspace System (NAS) efficiency by using the capabilities of the TBFM decision support tool — a system that is already deployed to all en route centers in the contiguous United States. Improvements in TBFM's core Time Based Metering (TBM) capability and its trajectory modeler, expansion of TBFM and its departure capabilities to additional locations, and enhancements to TBFM's departure capabilities improve efficiency, and optimize demand and capacity. Improvements will also focus on scheduling and interval management tools that further expand TBM benefits to safely assure the smooth flow of traffic and increase the efficiency of the NAS. Point-in-Space Metering — as well as TBM in the Terminal Environment and improved Management of Arrival, Surface and Departure Flow — extend, enhance and proliferate metering operations.

TARGET USERS

- Air traffic controllers
- Operators

TARGET AREAS

NAS-wide

ANTICIPATED BENEFITS

EFFICIENCY

Efficiency is improved through the introduction of capabilities in this portfolio that will:

- Expand TBM and other advanced TBFM-based capabilities to additional geographical areas, as they provide more efficient traffic flow compared to traditional miles-in-trail traffic flow management
- Enable TBFM's use of more accurate trajectories, which will translate into more accurate estimated arrival times, resulting in more efficient slot and delay allocation
- Increase departure-time compliance by enabling control tower personnel to manage ground operations to meet self-scheduled, deconflicted departure times

ENVIRONMENT

- More efficient flight paths reduce fuel burn and emissions through reduced holding and improved delivery to optimized descents

- Ensures elements of the aviation system contribute to the protection of the environment by considering noise, aircraft exhaust emissions and other environmental issues in the implementation and operation of the NAS

PREDICTABILITY

Predictability is increased by expanding the use of TBM from departure through the en route environment, and ultimately to the airport.

FUNDING

SUPPORTED BY AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST

OI 102118 – Interval Management – Spacing

SUPPORTED BY NEXTGEN TBFM/TBFM PORTFOLIO

OI 104115 – Current Tactical Management of Flow in En Route for Arrivals and Departures

OI 104117 – Improved Management of Arrival/Surface/Departure Flow Operations

OI 104120 – Point-in-Space Metering

OI 104123 – TBM Using Area Navigation and Required Navigation Performance Route Assignments

OI 104128 – TBM in the Terminal Environment

TIME BASED FLOW MANAGEMENT

	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Time Based Flow Management (TBFM) Work Package (WP) 3	Investment Analysis WP 3 – Final Investment Decision (FID) Q3 FY 2015			
TBFM Tech Refresh	Begin Investment Analysis activities	IARD in September 2016	FID expected in Q2 FY 2017	
Interval Management – Spacing (IM-S) Cruise	• Achieved IM-S Approach, Arrivals & Cruise (AA&C) Investment Analysis Readiness Decision (IARD) Q4 FY 2015 • Flight Deck Interval Management (FIM) Minimal Operations Performance Standards (MOPS) v1 Plenary Approval	Complete Final Program Requirements (fPR)	Investment Analysis activities	Advanced Interval Management (A-IM) IID, Q4 FY2018
IM-S Arrivals and Approach	• Achieved IM-S AA&C IARD Q4 2015 • FIM MOPS v1 Approval	Complete fPR	Investment Analysis activities	FID expected in Q1 FY 2018
Complex Clearances			Work supports Segment Charlie capabilities	
TBFM WP 4 • Path Stretch • Flight Operations Center (FOC) Preferences • Incorporated into Metering			Engineering activities to address Fleet Prioritization	IARD expected in Q4 FY 2018
Implementation Phase:				
TBFM WP 2	Operationally Available for FY 2015			

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

TIME BASED FLOW MANAGEMENT

	FY 2015	FY 2016	FY 2017	FY 2018+
Increments implemented: • 104120-11 Extended Metering • 104123-12 Ground-based Interval Management - Spacing[1] • 104115-11 Implement Traffic Management Advisor's (TMA) Adjacent Center Metering Capability at Additional Locations • 104115-12 Implement TMA at Additional Airports • 104123-11 Use Area Navigation Route Data to Calculate Trajectories Used to Conduct Time Based Metering (TBM) Operations • 104117-11 Integrated Departure/Arrival Capability (IDAC)[2]				
TBFM WP 3		Software design and development for Terminal Sequencing and Spacing (TSAS)	• Begin Integration testing of initial TSAS software builds (TBFM-STARS) • Procure IDAC hardware	• TSAS Operationally Available in FY 2019 • Begin IDAC deployment in FY 2018
Increments implemented: • 104128-24 TBM in the Terminal Environment • 104117-11 IDAC[2]				
TBFM Tech Refresh				Begin site installation in FY 2018. Finish all site installations by FY 2021
Increment implemented: N/A				
IM-S Cruise				Operationally Available in FY 2022
Increment implemented: • 102118-21 IM-S Cruise				
IM-S Arrivals and Approach				Operationally Available in FY 2022
Increment implemented: • 102118-23 IM-S Arrivals and Approach				
Complex Clearances				Operationally Available in FY 2023+
Increment implemented: • 104123-23 Complex Clearances				

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

TIME BASED FLOW MANAGEMENT				
	FY 2015	FY 2016	FY 2017	FY 2018+
Path Stretch				Operationally Available in FY 2022+
Increment implemented: • 104123-21 Lateral Maneuvering for Delay Absorption (Path Stretch)				
FOC Preferences Incorporated into Metering				Operationally Available in FY 2022
Increment implemented: • 104120-28 FOC Preferences Incorporated into Metering				

[1] Formerly Arrival Interval Management Using Ground Automation. Moved from OI 104120 to OI 104123.
[2] Timeline extended to capture the remaining waterfall schedule of 15 sites.

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

COLLABORATIVE AIR TRAFFIC MANAGEMENT

Collaborative Air Traffic Management (CATM) coordinates flight and flow decision making by flight planners and FAA traffic managers to improve overall efficiency of the National Airspace System (NAS), provide greater flexibility to flight planners and make the best use of available airspace and airport capacity. The overall philosophy driving the delivery of CATM services is to accommodate user preferences to the maximum extent possible. Traffic managers issue traffic management initiatives (TMI) to deal with congestion, weather, special activity airspace or other constraints. These initiatives can alter users' flight plans. The effect of TMIs can be reduced by tailoring flow management actions to specific flights.

CATM services are targeted to deliver a combination of increased information on the users' preferred alternative routes, enhanced tools for assessing the impact of rerouting decisions and improved communications and display of instructions to controllers in order to accommodate user preferences to the maximum extent possible.

TARGET USERS

- Air traffic controllers
- Traffic managers
- Operators

TARGET AREAS

NAS-wide

ANTICIPATED BENEFITS

CAPACITY

This portfolio increases capacity through the introduction of capabilities that result in:

- Imposing fewer en route capacity constraints as congestion is resolved through tailored incremental congestion responses
- Automated congestion resolution tools matching user preferences to airspace with available capacity

FLEXIBILITY

Capabilities in this portfolio improve flexibility by:

- Increasing user route flexibility through negotiated trajectories for congestion resolutions
- Simplifying the relief of departure queues and reduction of surface delays through Integrated Departure Route Planning decision support
- Facilitating the ability of local traffic managers to balance workload even on days when there are no major impacts from severe weather
- Enabling improved or optimal runway assignments considering airspace configuration changes

EFFICIENCY

This portfolio provides efficiency benefits through:

- Increasing aggregate flight efficiency by factoring individual flight trajectories into the congestion solution
- Reducing arrival delay by identifying opportunities for reopening arrival airspace
- Advanced forecast of impact and clearing, enabling the decision to hold arrivals at higher altitudes or on the ground, reducing fuel burn, emissions and terminal congestion
- Optimizing flight trajectory before takeoff (pre-departure) or entry into oceanic airspace (pre-oceanic) to reduce fuel consumption and environmental impact of oceanic flights

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FUNDING

SUPPORTED BY NEXTGEN CATM TECHNOLOGY/CATM PORTFOLIO

OI 104208 – Enhanced Departure Flow Operations

OI 105208 – Traffic Management Initiatives with Flight-Specific Trajectories

OI 105207 – Full Collaborative Decision-Making

OI 105302 – Initial Flight Day Evaluation

OI 105303 – Advanced Flight Day Evaluation

COLLABORATIVE AIR TRAFFIC MANAGEMENT

	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Collaborative Air Traffic Management – Technology (CATM-T) Work Package (WP) 4	Concept Validation and Acquisition Management System Work – Final Investment Decision targeted for Q4 FY 2016			
Implementation Phase:				
CATM-T WP 1	Deployment targeted for end of Q2 FY 2016			
Increment Implemented • 104208-11 Delivery of Pre-Departure Reroutes to Controllers				
CATM-T WP 2	Deployment targeted for Q2 FY 2016			
Increment Implemented • 105208-21 Airborne Rerouting				
CATM-T WP 4			CATM-T WP4 system engineering, design and development activities through FY 2019+	Operationally available FY 2020
Increments Implemented • 105207-26 Integrated Departure Route Planning • 105303-21 Improve Demand Predictions[1]				
Traffic Flow Management System Release 13		Operationally available FY 2016+		

[1] Previous number was 105302-21

Concept | Development | Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

SEPARATION MANAGEMENT

Separation Management focuses on the enhancement of aircraft separation assurance. Improvements will provide air traffic controllers with tools and procedures to separate aircraft with different types of navigation equipment and wake performance capabilities, in what is known as a mixed environment.

The increments in this portfolio will achieve success by enhancing current National Airspace System (NAS) infrastructure — through integration of enabling technologies into air traffic control automation systems, new standards and procedures. Common Automated Radar Terminal System, Standard Terminal Automation Replacement System, Advanced Technologies and Oceanic Procedures and En Route Automation and Modernization are the key automation systems impacted by this portfolio.

TARGET USERS

- Air traffic controllers
- Operators

TARGET AREAS

NAS-wide

ANTICIPATED BENEFITS

Capabilities in this portfolio will enhance aircraft separation assurance by safely reducing separation between aircraft, and as a result improve capacity, efficiency and safety in the NAS.

CAPACITY

Capabilities in this portfolio will support an increase in capacity by:

- Increasing airport throughput as a result of the closer spacing of flights accepted from Terminal Radar Approach Control airspace, managed on final approach
- Enabling air traffic controllers and pilots through reduced separation between aircraft to manage increasing traffic levels in oceanic airspace

EFFICIENCY

This portfolio will provide improved efficiency by introducing capabilities that will:

- Enable more oceanic flights to ascend and descend to their preferred altitudes, increasing the efficiency due to optimized flight profiles
- Allow controllers to approve additional pilot requests for direct routes and more efficient altitudes

SAFETY

This portfolio will provide controllers automated information about wake vortex separation requirements for any given aircraft pair, along with accurate wind data, which will enhance current separation standards.

FUNDING

SUPPORTED BY NEXTGEN SYSTEM DEVELOPMENT/SEPARATION MANAGEMENT PORTFOLIO

OI 102154 – Wake Recategorization

SUPPORTED BY NEXTGEN TRAJECTORY BASED OPERATIONS (TBO)

OI 104104 – Initial Conflict Resolution Advisories

SUPPORTED BY NEXTGEN TBO/SEPARATION MANAGEMENT PORTFOLIO

OI 102117 – Reduced Horizontal Separation Standards En Route – 3 Miles

OI 102137 – Automation Support for Separation Management

OI 102146 – Flexible Routing

OI 102152 – Dynamic, Pair-wise Wake Turbulence Separation

OI 104102 – Optimized Oceanic Trajectories via Interactive Planning

OI 108212 – Improved Management of Special Activity Airspace

OI 104122 – Integrated Arrival and Departure Airspace Management

OI 104127 – Automated Support for Conflict Resolution

SUPPORTED BY NEXTGEN TBO/SEPARATION MANAGEMENT PORTFOLIO AND AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST

OI 102108 – Oceanic In-Trail Climb and Descent

SEPARATION MANAGEMENT

	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Oceanic Tactical Trajectory Management (OTTM) - Advanced Technologies and Oceanic Procedures (ATOP) Enhancement Work Package (WP) 1		• Investment Analysis Readiness Decision (ATOP WP1) – Targeted for Q2 FY 2017 • Final Investment Decision (FID)(ATOP WP 1) – Targeted for Q2 FY 2018		
OTTM - ATOP Concept Engineering	Concept Engineering in support of ATOP WP 1			
Implementation Phase:				
Oceanic In-Trail Climb and Descent	Software build development and release to key site		Operational Readiness by 2016	
Increments implemented: • 102108-12 Enhanced Oceanic Climb/Descent Procedure via Automatic Dependent Surveillance–Contract Automation • 102108-13 Automatic Dependent Surveillance–Broadcast (ADS-B) Oceanic In-Trail Procedure and Automation†				
ATOP Enhancement WP1				Operational Readiness by 2023
Increments implemented: • 104102-22 Approval of User Requests in Oceanic Airspace - Auto Re-Probe • 104102-25 Preferred Routing in Constrained Oceanic Airspace (Data Exchange via System Wide Information Management) • 104102-26 Approval of User Requests in Oceanic Airspace - Conflict Resolution Advisory • 104102-30 Enhanced Conflict Probe for ATOP Surveillance Airspace				
Pre-Implementation Phase:				
ERAM Sector Enhancements		FID – Targeted Q4 FY 2016		
Modern Procedures	Concept Engineering in support of ERAM enhancements			

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

SEPARATION MANAGEMENT

	FY2015	FY2016	FY2017	FY2018+
UAS Integration Demonstration	Demonstration project			
Wake Turbulence Recategorization (Recat)	Developed SRMD for Recat Phase II		Phase III – design of dynamic wake separation standards	
Implementation Phase:				
Wake Recat, Phase 1.5 (improved version of Phase I standards)	Implementation at IAH/HOU, CLT, JFK/EWR/ LGA and ORD	Implementation at DEN		
Increments implemented: • 102154-11 Wake Recategorization Phase 1 - Aircraft Recategorization • 102137-15 Automated Terminal Proximity Alert for In-Trail Separation				
Wake Recat, Phase 2.5 (improved version of Phase II standards)		Implementation at IND, SFO, ANC, HNL, LAX and IAD		
Increments implemented: • 102154-21 Wake Recat Phase 2 - Static Pair-wise Wake Separation Standards				
En Route Automation Modernization (ERAM) Sector Enhancement Work Package			Segment 1 ERAM SE capabilities system engineering and design work	First IOC by 2020. Full Operational Readiness by 2025+
Increments implemented: • 101202-22 Unique Attributes for Unmanned Aircraft Systems (UAS) Flight Planning • 102112-22 UAS Air Traffic Control Direct Communications • 102152-02 Wake Turbulence Mitigations for En Route Controllers[1]				

[1]Formerly 102117-21. Increment moved from OI 102117 to OI 102152.

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

ON-DEMAND NAS INFORMATION

On-Demand National Airspace System (NAS) Information will provide flight planners, air traffic controllers, traffic managers and flight crews with consistent and complete information related to changes in various areas of the NAS. These include temporary flight restrictions, temporary availability of special activity airspace, equipment outages and runway closures. The capabilities in this portfolio will be realized through net-enabled information access to and exchange of aeronautical and flight information using common data formatting and information exchange standards.

TARGET USERS

- Air traffic controllers
- Traffic managers
- Flight planners
- Flight crews

TARGET AREAS

NAS-wide

ANTICIPATED BENEFITS

Improving the consistency, completeness and accuracy of NAS advisory service information has the following anticipated benefits:

- Reduced fuel burn and operating costs related to planning around constraints that more accurately represent NAS status and airspace usage
- Increased flexibility of the NAS to enable users to adapt according to their own needs
- Simplified maintenance of and improved safety within the NAS

CAPACITY

Capabilities in this portfolio permit coordination of available schedules for special activity airspace, providing access to airspace that otherwise would not be available, thereby improving airspace capacity.

EFFICIENCY

Flight efficiency will be improved by reducing flight time and distance — which reduces fuel burn and emissions — for operators who opt for more efficient routes through awareness of the availability of special activity airspace.

PREDICTABILITY

Capabilities in this portfolio provide real-time status of airspace, enabling operators to more predictably plan their schedules.

SAFETY

Real-time traffic, flight and NAS status information sent directly to the flight deck offers an additional margin of safety, providing flight crews information quickly and in a usable form.

FUNDING

SUPPORTED BY AUTOMATIC DEPENDENT SURVEILLANCE–BROADCAST(ADS-B)

OI 103209 – Enhanced Traffic Advisory Services

SUPPORTED BY NEXTGEN ADS-B, COLLABORATIVE AIR TRAFFIC MANAGEMENT TECHNOLOGY (CATMT)/COLLABORATIVE AIR TRAFFIC MANAGEMENT (CATM) PORTFOLIO AND SYSTEM WIDE INFORMATION MANAGEMENT (SWIM)

OI 103305 – On-Demand NAS Information

SUPPORTED BY NEXTGEN CATM/ON-DEMAND NAS PORTFOLIO, CATMT/CATM PORTFOLIO AND SWIM

OI 108212 – Improved Management of Special Activity Airspace

OI 103306 – Tailored Delivery of On-Demand NAS Information

ON DEMAND NAS INFORMATION

	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Aeronautical Information Management Modernization (AIMM) Segment 3	AIMM Segment 3 Target AMS Milestones: • Concept and Requirements Definition Readiness Decision FY 2016 • Investment Analysis Readiness Decision FY 2016 • Initial Investment Decision FY 2018 • Final Investment Decision FY 2019			
Implementation Phase:				
AIMM Segment 1	Operationally available through FY 2015			
Increments implemented: • 103209-01 Traffic Situational Awareness with Alerts • 103305-13 Provide National Airspace System (NAS) Status via Digital Notices to Airmen (NOTAM) or Flight Operations Centers/Airline Operations Centers • 103305-23 Airborne Access to Information Portal • 108212-12 Improve Special Use Airspace-Based Flow Predictions				
AIMM Segment 2	AIMM Segment 2 Operational Development Activities			Operationally Available in FY 2018–FY 2020
Increments implemented: • 103305-12 Improved Access to NAS Aeronautical, Status and Constraint Information for Authorized NAS Users and Subscribers • 103306-02 Tailored NAS Status via Digital NOTAMs for Air Navigation Service Providers (ANSP) • 108212-21 Improve Access to Special Activity Airspace (SAA) Information				
AIMM Segment 3				AIMM Segment 3 Operational Development Activities in FY 2019+
Increment implemented: • 108212-11 ANSP Real-Time Status for SAAs				

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

ENVIRONMENT AND ENERGY

Environment and Energy uses a comprehensive five-pillar approach to overcome the environmental constraints that are facing aviation from air quality, climate, energy, noise and water quality concerns. The approach comprises improved scientific knowledge and integrated modeling; air traffic management modernization and operational improvements; new aircraft technology; sustainable alternative aviation fuels and policies; environmental standards and market-based measures. The environmental performance of the National Airspace System (NAS) is being examined to identify additional system improvements that can help to achieve the goal of sustainable aviation growth.

TARGET USERS

- Air traffic controllers
- FAA
- Airports
- Airline operators
- Manufacturers

TARGET AREAS

Airport Local to NAS-wide

ANTICIPATED BENEFITS

By addressing environmental constraints facing aviation, this portfolio is helping the FAA meet its vision to reach the next level of environmental responsibility and global leadership. This portfolio provides the fundamental knowledge and tools to quantify the environmental impacts of aviation that are needed to support the NextGen Implementation Plan. Work within the portfolio is maturing technologies that can advance alternative jet fuels, reduce aircraft noise and lower greenhouse gas and other emissions that degrade air quality and contribute to climate change. This portfolio also supports the United States leadership position on international environmental negotiations for standard setting and policy making. These efforts are designed to reduce the environmental impacts of aviation in absolute terms, including those relating to community noise, air quality and global climate change.

FUNDING

SUPPORTED BY ENVIRONMENT PORTFOLIO

OI 701102 – Integrated Environmental Modeling – Phase I

OI 701103 – Integrated Environmental Modeling – Phase II

OI 702102 – NextGen Environmental Engine and Aircraft Technologies – Phase I

OI 704102 – Environmental Policies, Standards and Measures – Phase I

OI 704103 – Environmental Policies, Standards and Measures – Phase II

SUPPORTED BY NEXTGEN RESEARCH, ENGINEERING AND DEVELOPMENT

OI 701102 – Integrated Environmental Modeling – Phase I

OI 702102 – NextGen Environmental Engine and Aircraft Technologies – Phase I

OI 702103 – NextGen Environmental Engine and Aircraft Technologies – Phase II

OI 703102 – Sustainable Alternative Jet Fuels – Phase I

OI 703103 – Sustainable Alternative Jet Fuels – Phase II

ENVIRONMENT AND ENERGY				
	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Integrated Environmental Modeling - Phase I	Development work from FY 2010– FY 2015			
Integrated Environmental Modeling - Phase II		Development work FY 2016+		
NextGen Environmental Engine and Aircraft Technologies - Phase I	Development work occurred from FY 2010– FY 2015 with additional testing and maturation demonstration of technologies occurring through FY 2017			
NextGen Environmental Engine and Aircraft Technologies - Phase II		Development work FY 2016+		
Sustainable Alternative Jet Fuels - Phase I	Development work from FY 2010– FY 2015			
Sustainable Alternative Jet Fuels - Phase II		Development work FY 2016+		
Environmental Policies, Standards and Measures - Phase I	Development work from FY 2009– FY 2015			
Environmental Policies, Standards and Measures - Phase II		Development work FY 2016+		
Implementation Phase:				
Integrated Environmental Modeling - Phase I	Available in FY 2015			

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

ENVIRONMENT AND ENERGY				
	FY 2015	FY 2016	FY 2017	FY 2018+
Increments implemented : • 701102-02 Aviation Environmental Design Tool Version 2B • 701102-03 Improved Scientific Knowledge • 701102-04 Aviation Environmental Portfolio Management Tool				
Integrated Environmental Modeling - Phase II				Available in FY 2020
Increments implemented : • 701103-01 Aviation Environmental Tools Suite				
NextGen Environmental Engine and Aircraft Technologies - Phase I	Availability in FY 2015+			
Increments implemented : • 702102-05 Engine Weight Reduction and High-Temperature Impeller • 702102-06 Flight Management System - Air Traffic Management Integration • 702102-07 Ultra High-Bypass Ratio Geared Turbo Fan • 702102-08 Ceramic Matrix Composite Turbine Blade Tracks • 702102-09 Dual-Wall Turbine Vane				
NextGen Environmental Engine and Aircraft Technologies - Phase II				Available to industry in FY 2020+
Increments implemented: • 702103-03 Explore and Demonstrate New Technologies Under Continuous Lower Energy, Emissions and Noise - Phase II				
Sustainable Alternative Jet Fuels - Phase I	Available to industry in FY 2015			
Increments implemented: • 703102-02 Drop-In >50% HRJ/HEFA Fuels (Greater than 50% Blend) • 703102-03 Other Advanced Aviation Alternative Fuels - Phase I				
Sustainable Alternative Jet Fuels - Phase II				Available to industry in FY 2020
Increments implemented: • 703103-01 Other Advanced Drop-In Aviation Alternative Fuels - Phase II • 703103-02 Generic Methodology for Alternative Fuels Approval				

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

ENVIRONMENT AND ENERGY				
	FY 2015	FY 2016	FY 2017	FY 2018+
Environmental Policies, Standards and Measures - Phase I	Available to industry FY 2015			
Increments implemented: • 704102-03 Environmental Targets • 704102-04 Environmental Assessment of NextGen Capabilities • 704102-05 Analysis to Support International Environmental Standard-Setting - Phase I • 704102-06 Environmental Goals and Targets Performance Tracking System • 704102-07 NextGen Environmental Management System (EMS) Frameworks and Stakeholder Collaboration				
Environmental Policies, Standards and Measures - Phase II				Available to industry in FY 2020
Increments implemented: • 704103-01 Environmental Performance and Targets • 704103-04 Analysis to Support International Environmental Standard-Setting - Phase II				

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

SYSTEM SAFETY MANAGEMENT

System Safety Management is developing data acquisition, storage, analysis and modeling capabilities to meet the safety analysis needs of NextGen designers, implementers and practitioners. These resources will be used throughout the FAA to ensure that new capabilities either improve or maintain current safety levels while simultaneously improving capacity and efficiency in the National Airspace System (NAS). The portfolio currently contains two projects.

The Aviation Safety Information Analysis and Sharing (ASIAS) project collects aviation data from more than 100 commercial and general aviation operations sources, and fuses the data to improve the analysis of complex issues related to NextGen operational improvements. ASIAS also maintains many aviation-related metrics and benchmarks that enable analysts to monitor important aviation system characteristics.

The System Safety Management Transformation (SSMT) project, which uses ASIAS data and other information sources, is developing data analysis and modeling capabilities that will enable safety analysis to determine how NAS-wide operational improvements will affect safety and evaluate potential safety-risk mitigations. SSMT results are returned to stakeholders for use in planning and evaluation, and to ASIAS for metrics development and tracking. Long-term tracking of ASIAS metrics are embedded in the SSMT risk analysis baseline capability (the Integrated Safety Assessment Model) to provide ongoing support to the NextGen safety assessment process.

TARGET USERS

- FAA
- Operators

TARGET AREAS

NAS-wide

ANTICIPATED BENEFITS

SAFETY

The capabilities in this portfolio enable the sharing of de-identified safety and risk data among the FAA and NAS users, which will identify NAS-wide trends and emerging airspace management risks before they result in accidents or incidents.

FUNDING

SUPPORTED BY SYSTEM SAFETY MANAGEMENT PORTFOLIO

OI 601102 – Enhanced Safety Information Analysis and Sharing
OI 601103 – Safety Information Sharing and Emergent Trend Detection
OI 601202 – Integrated Safety Analysis and Sharing

SYSTEM SAFETY MANAGEMENT

	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Enhanced Safety Information Analysis and Sharing	Aviation Safety Information Analysis and Sharing (ASIAS) 1.0. Development work from FY 2013–FY 2015			
Safety Information Sharing and Emergent Trend Detection		ASIAS 2.0 Development work from FY 2016–FY 2020		
Integrated Safety Analysis and Modeling (ISAM)	ISAM/ASIAC 1.0 Development work from FY 2014–FY 2017			
Implementation Phase:				
Enhanced Safety Information Analysis and Sharing		ASIAS 1.0 available in FY 2016		
Increments implemented : • 601102-01 Expanded ASIAS Participation • 601102-02 ASIAS Data and Data Standards • 601102-03 Enhanced ASIAS Architecture • 601102-04 Upgraded and Expanded ASIAS Analytical Capabilities • 601102-05 Vulnerability Discovery • 601102-06 ASIAS Studies and Results • 601102-07 ASIAS Collaboration Capabilities				
Safety Information Sharing and Emergent Trend Detection				ASIAS 2.0 available in FY 2021

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

SYSTEM SAFETY MANAGEMENT

	FY 2015	FY 2016	FY 2017	FY 2018+
Increments implemented : • 601103-01 Additional ASIAS Participants • 601103-02 NextGen Enabled Data • 601103-03 Architecture Evolution and NextGen Support • 601103-04 Analytical Capabilities in Support of NextGen • 601103-05 Automated Vulnerability Discovery • 601103-06 Continued Studies and Results • 601103-07 Expanded Collaboration Environments				
ISAM		ISAM/ASIAC 1.0 available in FY 2017–FY 2020		
Increments implemented: • 601202-01 Automated Operational Anomaly Detection, Analysis and Forecasting Models • 601202-02 System-Wide Integrated Risk Baseline Annual Reports • 601202-03 Tailored, Domain-Specific Baseline and Predictive Risk Models (NextGen Portfolio Support) • 601202-04 Integrated NAS-wide Hazard Identification, Evaluation and Forecasting • 601202-05 Integrated NAS-wide Automation System Modeling and Anomaly Detection • 601202-06 Near Real Time Integrated Safety Prediction Models				

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

NAS INFRASTRUCTURE

National Airspace System (NAS) Infrastructure provides research, development and analysis of capabilities that depend on and affect activities in more than one NextGen portfolio. Work in this portfolio includes capabilities that address aviation weather issues. This supports the need to improve air traffic management (ATM) decision-making during adverse weather conditions, improves the use of weather forecast information in the transformed NAS and evolves the existing aviation weather infrastructure — sensor, processor and dissemination systems — to standardize weather information and interfaces, reducing operational costs.

The portfolio also contains capabilities that address engineering issues. These include cross-cutting research, analysis, development and maturation of concepts for changes to terminal automation, NextGen navigation engineering and information management. The portfolio also consists of new ATM requirements — new air traffic control management procedures, separation standards and flexible airspace categories to increase throughput — to determine if these new systems can achieve the targets for 2025 and beyond.

TARGET USERS

- FAA
- Other government agencies (e.g., NOAA)
- Operators

TARGET AREAS

NAS-wide

FUNDING

SUPPORTED BY DATA COMMUNICATIONS

OI 102158 – Automated Support for Initial Trajectory Negotiation

SUPPORTED BY NAS INFRASTRUCTURE PORTFOLIO

OI 103119 – Initial Integration of Weather Information into NAS Automation and Decision Making
OI 103305 – On-Demand NAS Information

SUPPORTED BY TERMINAL FLIGHT DATA MANAGEMENT

OI 104211 – Surface Traffic Management

NATIONAL AIRSPACE SYSTEM INFRASTRUCTURE

	FY 2015	FY 2016	FY 2017	FY 2018+
Pre-Implementation Phase:				
Common Support Services – Weather	Final Investment Decision (FID) achieved Q2 FY 2015			
NextGen Weather Processor	FID achieved Q2 FY 2015			
Data Communications (Data Comm) Services				
Weather Observation	Improved automated winter weather observing capability technology maturation		Terminal Winds concept work	
Implementation Phase:				
Common Support Services - Weather		Development work – Targeting Initial Operating Capability (IOC) at key sites in 2019		
Increments Implemented • 103305-25 Common Support Services - Weather • 103119-13 Enhanced In-Flight Icing Diagnosis and Forecast • 103119-17 4-D Tailored Volumetric Retrievals for Aviation Weather Information • 103119-18 Enhanced Turbulence Forecast and Graphical Guidance • 103119-19 Enhanced Ceiling and Visibility Analysis				
NextGen Weather Processor – Work Package 1		Development work – Targeting Initial IOC at key sites in 2020		

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

NATIONAL AIRSPACE SYSTEM INFRASTRUCTURE

	FY 2015	FY 2016	FY 2017	FY 2018+
Increments Implemented • 103119-11 Enhanced NAS-wide Access of 0-2 Hours Convective Weather on Traffic Forecast for NextGen Decision- Making • 103119-14 Enhanced Weather Radar Information for Air Traffic Control Decision-Making • 103119-15 Extended Convective Weather on Traffic Forecast for NextGen Decision-Making • 103119-16 Convective Weather Avoidance Model for Arrival/Departure Operations				
Weather Observation			Develop Winter Weather Tech Transfer Package	
Increment Implemented • 103119-22 Enhanced Automated Winter Weather Information				
Data Comm Services		Initial En Route Services Data Comm Development – Targeting IOC at selected airspace and key sites in 2019		
Increment Implemented • 102158-01 Initial En Route Data Comm Services				
TFDM (Segment 1 and 2)			Development to begin following FID in Q3 FY 2016	
Increment Implemented • 104211-24 Integrate Surveillance Data with Flight Data (Surface)				

Concept Development Operation

† NextGen Advisory Committee/NextGen Integration Working Group Commitment

APPENDIX: NEXTGEN FUNDING*

BLI NUMBER	CAPITAL BUDGET LINE ITEM (BLI) PROGRAM	FY 2017 BUDGET	FY 2018 ESTIMATE	FY 2019 ESTIMATE	FY 2020 ESTIMATE	FY 2021 ESTIMATE
1A05	NextGen – Separation Management Portfolio	$25.8	$34.5	$41.5	$50.0	$62.0
1A06	NextGen – Improved Surface Portfolio	$2.0	$4.0	$8.0	$11.0	$9.0
1A07	NextGen – On Demand NAS Portfolio	$8.5	$17.0	$21.5	$34.5	$43.5
1A08	NextGen – Improved Multiple Runway Operations Portfolio	$6.5	$2.0	$1.0	$0.0	$0.0
1A09	NextGen – NAS Infrastructure Portfolio	$17.7	$24.0	$23.0	$24.0	$29.0
1A10	NextGen – Support Portfolio at WJHTC	$12.0	$12.8	$12.8	$12.8	$12.8
1A11	NextGen – Performance Based Navigation & Metroplex Portfolio	$17.5	$18.0	$18.0	$13.0	$13.0
2A01	NextGen – En Route Automation Modernization (ERAM) – System Enhancements and Technology Refresh	$78.0	$93.6	$106.1	$126.4	$150.0
2A11	NextGen – System-Wide Information Management (SWIM)	$28.8	$48.1	$42.9	$28.4	$9.4
2A12	NextGen – Automatic Dependent Surveillance–Broadcast (ADS-B) NAS Wide Implementation	$31.1	$27.9	$34.7	$43.5	$70.0
2A14	NextGen – Collaborative Air Traffic Management Portfolio	$13.8	$21.0	$22.0	$14.0	$20.0
2A15	NextGen – Time Based Flow Management (TBFM) Portfolio	$50.6	$49.6	$47.4	$42.8	$46.8
2A17	NextGen – Next Generation Weather Processor (NWP)	$27.8	$35.1	$24.3	$16.0	$6.2
2A19	NextGen – Data Communications in support of NextGen	$232.0	$194.7	$178.3	$170.6	$160.1
2B13	NextGen – National Airspace System Voice System (NVS)	$48.4	$68.4	$32.2	$116.6	$105.5
2B18	NextGen – Terminal Flight Data Manager (TFDM)	$42.2	$50.0	$79.0	$92.8	$95.2
3A09	NextGen – System Safety Management Portfolio	$17.0	$17.0	$17.0	$17.0	$17.0
4A09	NextGen – Aeronautical Information Management Program	$10.4	$7.9	$8.0	$15.0	$15.0
4A10	NextGen – Cross Agency NextGen Management	$2.0	$2.0	$2.0	$2.0	$2.0

* Note: FY 2017–FY 2020 outyear funding amounts are estimates from the FY 2017 budget request (dollars in millions). Source: FAA 2016 Capital Investment Plan.

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